national centrifuge cup 353A), covered with aluminium foil and autoclaved. In practice, however, contamination has never been a problem, and it has been found practicable to remove the used capillary tubes after one run and replace these carefully with fresh sterile ones. If the capillary tubes had been charged with pathogenic microorganisms, this handling procedure might constitute a hazard to the operator. In that event, the lower ends of the used capillary tubes should be immersed in an appropriate disinfectant contained in a suitable vessel such as a 600 ml beaker. The height of the vessel would be adjusted with the laboratory jack so that the capillary tubes are introduced below the surface of the disinfectant before their removal. Each tube would be individually removed by applying forceps below the lower polypropylene sheet of the capillary holder and carefully pulling downwards until the tube is freed from the teflon collar and slides into the disinfectant. This method effectively safeguards against splashing. If the number of cell suspensions

to be tested is large, the apparatus could be readily modified by preparing larger rectangular capillary holders and patterns as recommended by Hartman and Pattee (1968) and using appropriately sized plates.

Using the apparatus as described, it was found possible to inoculate the surface of 190 plates with 12 inocula on each plate in less than two hours.

The main advantages of this apparatus are its relatively low cost, its simplicity of operation, and its reproducibility of performance.

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Letters to the Editor

Immunofluorescent Techniques for the Diagnosis of Respiratory Syncytial Virus

Professors Court and Gardner in their recent letter (*J. clin. Path.*, 1973, 26, 312) find the immunofluorescent examination of nasopharyngeal secretions for combined detection and identification of respiratory syncytial (RS) virus 97% efficient whereas we have diagnostic results in only 45% (Urquhart and Walker, 1972). Differences in technique and reagents to explain these results are not apparent from published reports (Gardner and McQuillan, 1968; McQuillan and Gardner, 1968) although we note that others using this technique (Hers, 1963) experienced variable results with positive diagnoses in 38% to 82%. However, we agree that immunofluorescence is specific.

Conversely in applying immunofluorescence for combined detection and identification of RS virus in tissue cultures we find 95% overall agreement with standard tests (Urquhart and Martin, 1970) whereas they find only 87% comparative efficiency (Gardner and McQuillan, 1968; McQuillan and Gardner, 1968). Again details of technique and the time at which tests are applied are important and could account for these differences. An analysis of variables in this method of

application shows a major problem to be small numbers of infective virus particles in inocula (Urquhart and Martin, 1970).

While further evaluation of both of these applications proceeds in individual laboratories we may say that for identification of tissue culture isolates showing cytopathic effect, the immunofluorescent test is 100% efficient (Urquhart and Martin, 1970).

This alone represents significant improvement in laboratory efficiency and ensures continuation of immunofluorescence as an essential laboratory procedure in the diagnosis of RS virus infection.

G. E. D. URQUHART¹
G. H. WALKER

*University of Glasgow Department of Infectious Diseases,
Ruchill Hospital,
Glasgow*

¹Present address, Public Health Laboratory, Gloucester.

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Trypsin-treated Human Erythrocytes for Rubella Haemagglutination Inhibition Tests

The haemagglutination inhibition (HI) test is the most sensitive and practical test for the detection of rubella antibodies and is now in general use in virological laboratories. The cells most often employed in the test are 1-day-old chick erythrocytes since they have a high sensitivity to specific agglutination.

We wish to draw the attention of laboratory workers to the report by Quirin (1972) of the usefulness of trypsin-treated human O erythrocytes instead of chick cells for the rubella HI test. He compared rubella HI antibody titres obtained by trypsin-treated human ery-

throcytes (Biddle, 1971) and by 1-day-old chick erythrocytes; the results with each of these cell systems were essentially the same.

We have confirmed Quirin's findings that similar titres are given by trypsin-treated human group O cells and by chick cells in rubella haemagglutination (HA) tests and in tests of human sera (56 tested). The procedure, adapted from Quirin's method, was as follows.

1 Nonspecific inhibitors were removed from test sera by dextran sulphate and calcium chloride as described by Liebhaber (1970). (In contrast to the use of chick cells no adsorption with red cells is required when using group O human erythrocytes for HA and HI tests.)

2 Human group O erythrocytes were washed thrice in phosphate-buffered saline (PBS) and packed by centrifugation at 3000 rev/min in a graduated centrifuge tube; concentration of cells was adjusted volumetrically to 10% by adding phosphate-buffered saline.

3 To each ml of 10% erythrocytes was added 0.1 ml of a 1% solution of crystalline trypsin in deionized water; this was mixed gently by inverting the tube and then held at room temperature for one hour.

4 The trypsinized cells were washed as in step 2 and standardized photometrically to a 10% concentration with PBS; this 10% suspension could be stored for up to five days at 4°C. For titration of rubella antigen and for HI tests a 0.3% suspension of trypsinized erythrocytes was used; after adding cells tests were incubated at 37°C since agglutination patterns were better at this temperature than at 4°C.

5 Titration of rubella antigen and testing of sera by HI tests were carried out by microtechnique, using 'V' plates, with HEPES buffer as diluent for test sera, antigen, and for diluting 10% standardized suspension of red cells in PBS to 0.3% (Liebhaber, 1970; Grist *et al*, 1973).

The trypsinization procedure does not prolong the time necessary for the HI test and trypsin-treated human cells have several advantages over chick cells. Quirin stressed their ready availability as a major advantage. He preferred fresh blood from human volunteers but we have found that packed erythrocytes obtained weekly from the regional blood bank are satisfactory. The main disadvantage of chick cells is that their collection is time-consuming and commercial supplies are expensive. Also, since chick erythrocytes

deteriorate fairly quickly, weekly supplies are necessary; even so, problems may be encountered in warm weather.

We have now used human erythrocytes in place of chick erythrocytes over the past three months and have obtained consistent titres for both rubella antigen and control high-positive and low-positive rubella sera.

CHRISTINA M. BANNERMAN

CONSTANCE A. C. ROSS

Regional Virus Laboratory, Ruchill Hospital, Glasgow, G20 9NB

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Book reviews

Recent Advances in Clinical Pathology Series 6. Edited by S. C. Dyke with E. N. Allott, M.S. Dunnill, P. G. H. Gell, G. Wetherley-Mein and R. E. Williams. (Pp. xii + 484; 205 figures, £7.50.) Edinburgh and London: Churchill Livingstone, 1973.

The diversity of clinical pathology threatens to fragment the whole subject into more and more small specialized pieces. How can we best keep up with our branch of the subject, and with clinical pathology as a whole? One answer lies with the series of *Recent Advances* still edited by the indefatigable Dr S. C. Dyke and now presenting its sixth volume.

Many will be pleased that the division into separate disciplines of microbiology, histopathology, etc., has been abandoned. It has always been rather arbitrary and the arrival of a subject such as Australian antigen, which impinges on all forms of practical pathology, illustrates the essential unity of clinical pathology. Of course, most of the topics can be classified and, to some extent too, they fall into categories of applied or general knowledge. 'Host resistance to cancer', a topic of evergreen interest, has yet to find a practical application, while others such as 'chromosome banding', 'leprosy', 'muscle pathology', and 'the carotid bodies' are for the cognoscenti.

For the most part the contributions describe changes in laboratory practice. Thus in chemistry 'plasma cortisol', 'calcitonin', 'gas-liquid chromatography' and the 'practice of toxicology' are considered. Matters of technique govern the chapters on 'antibiotic sensitivity testing' and 'thin section technique' and predominate in the chapters on 'histocompatibility testing', 'identification of streptococci', and 'paraproteins'. Haematology is brought up to date with a chapter on 'intravascular coagulation', a section on 'blood transfusion', and some useful notes on miscellaneous topics, theoretical and applied.

Amidst a plethora of new books and journals crammed with reviews, editorials, and annotations, the would-be complete pathologist must be selective in his reading and buying. Is this a book to which he could, perhaps, give a miss? To do so would be a pity as its quality and production are excellent. To the trainee aspiring to the Primary MRCP