Simple slide-rule conversion between hydrogen ion concentration and pH values

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On a slide-rule that has both a logarithm (L) scale and a reciprocal (CI) scale it is possible with minimal arithmetic to convert in a single step between

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hydrogen ion concentration, $[H^+]$, and hydrogen ion activity exponent, pH. For the biological range, a reading on the L scale plus 7, as pH, is opposite a reading on the CI scale multiplied by 10, as $[H^+]$ in nanomoles per litre; in the figure the cursor connects a pH of 7.13 with the hydrogen ion concentration of 74 nmol/l. Similarly $L + 6 \equiv CI \times 100$, and $L + 8 \equiv CI \times 1$.

The same calculation is used for other ions, such as sodium, that may be expressed either as concentration or as activity exponent.

Fig Portion of slide rule showing numerical connexion between $[H^+]$ on CI scale, and decimal figures (mantissa) of pH on L scale.

Letter to the Editor

Technique for the NBT Test

We were interested to read the technique of Freeman and King (1972). We have been using a method which offers the advantages of being quicker, using materials readily available in a haematology laboratory, and allowing accurate cell identification (figure).

Into a plastic tube are put 2 drops of a saturated solution of NBT in 0.9% saline, 2 drops of 0.15M phosphate-buffered saline (pH 7.2), and 2 drops of whole blood to be tested. An expected 'high' control and an expected 'normal' control are treated in the same way. After gentle mixing the tubes are incubated at 37°C for 15 minutes and then at room temper-

Fig. Ease of distinction between granulocytes and other cells. One granulocyte contains formazan. The appearance is much clearer in the original coloured preparation.

ature for 30 minutes. To the tubes are now added 2 drops of 0.5% neutral red in 1% acetic acid. After gentle mixing and five minutes at room temperature a coverslipped wet preparation is scored for the percentage of neutrophils containing blocks of formazan.

We have found that the use of EDTA as an anticoagulant does not alter the correlation with proven bacterial infection provided the sample is tested the same day as collection, but we agree with the normal range (1-15%) given by Freeman and King.

We also agree that 'it cannot be sufficiently emphasized that this test depends on many factors' and would go further to state that its interpretation in a general hospital situation is fraught with difficulty. We have evidence that myeloproliferative disease, severe renal failure, and virus infection may all produce abnormal results.

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Book reviews

Basic Haematology An introduction for student medical technologists and assistants. By Arthur Simmons. (Pp. xv + 278; illustrated. \$12.75.). Springfield, Illinois: Charles C. Thomas. 1973.

This small book is compiled from the lectures given to student technicians in Iowa and intentionally omits specific technical detail, but includes two colour prints depicting red and white cell maturation that are so bad as to be misleading. When will publishers learn to eschew colour prints of artists' impressions of microscope preparations in haematology? It will serve as a useful introduction at sixth-form or Higher National Certificate level and, indeed, contains a wealth of useful theoretical detail that would do medical students no harm to learn.

It is unfair to compare the cost of American publications with their British counterparts. At \$12.75 this book, lacking technical detail, will have an uphill battle on the English market but it can be recommended for technical college libraries and the larger laboratories responsible for running training courses for student technicians.

J. L. STAFFORD

Pathology of Mental Retardation 2nd ed. By L. Crome and J. Stern. (Pp. vii + 544; illustrated. £9.00.) Edinburgh and London: Churchill Livingstone, 1972.

Mental retardation is a subject which is prominent in the thoughts of many people at this time, so the presentation of a second edition of this book by Drs Crome and Stern is especially welcome. The first edition was received enthusiastically by many, and the new volume brings up to date the contents and discussion of the problems involved, as well as widening the field, for many new conditions have been described.

In addition to 13 chapters there are appendices in which a variety of techniques and methods, of nomenclature on chromosomes, and the collection of material for examination are very well described.

The chapters include aspects relating to genetics, perinatal factors, and post-natal causes of disease, as well as general pathological studies. There are discussions on Down's syndrome, the lipidoses and

leucodystrophies, aminoacidurias, and a variety of other neurometabolic disorders. There is a most valuable chapter listing briefly the many syndromes (206 of them) with comments listing references, genetic, clinical, and pathological findings.

In all there must be over 3000 authors mentioned whose work has quite obviously been studied and to which reference is made.

Naturally there are a few errors such as the wrong reference to a table and the variability in the use of symbols for the various gangliosides. As is to be expected a few articles which may be of some importance are not quoted.

A remarkable number of unusual, unique cases are discussed, yet few statistics are available giving the relative frequency of the various diseases as found in a routine hospital practice.

This volume can be thoroughly recommended to all interested in this subject, especially to paediatric clinicians and to pathologists of all disciplines.

J. N. CUMINGS

Hodgkin's Disease By Henry S. Kaplan. (Pp. xi + 452; illustrated. £8.25.) London: Harvard University Press. Oxford University Press. 1973.

Hodgkin's disease, a condition that is apparently unique to man, has occupied the attention of many of the best pathologists and physicians of the last hundred years. Perhaps we are not much nearer to understanding its cause than was Thomas Hodgkin, but in all other respects knowledge has expanded enormously, especially within the last two decades. In staging and classification the Rye Conference of 1966 was a landmark which should by now be familiar to all pathologists and clinicians who profess to diagnose the disease. For treatment and management the rules are less clearly defined and here there has been even greater progress.

All this, and much besides, is now encompassed in a single, one-author volume by Henry Kaplan. It is an astonishing virtuoso performance, precise yet fluent, detailed but never fussy, and presenting the controversies—on spread of disease and on curability, for example—in an urbane but compelling way. Above all it is authoritative, being the product of first-hand observation and original thought. The excellent tables, diagrams, and illustrations are mostly from the