and the resulting haematocrit is easily calculated from the initial volume of the blood sample (BV₀), the volume of saline added, and the initial haematocrit (Hct₀). This is illustrated in the top six rows of the table, in which the initial volume of the blood sample is taken to be 5 ml and the haematocrit 0.4. Similarly, if saline is the diluting fluid the protein content of the diluted plasma remains constant, although the concentration falls with increasing dilution. This is illustrated in rows 8, 9, and 10 of the table.

The haematocrit is defined by $Hct = RBC/BV$, so that $Hct_0 = RBC/BV_0$ and $Hct_n = RBC/BV_n$, from which it follows that $Hct_n/Hct_0 = BV_0/BV_n$ (noting that BV_n is the blood volume corresponding to Hct_n). In a similar way the protein content (P) of the samples is unchanged, and if initial and diluted protein concentrations and plasma volumes are represented by P_{co} , P_{cn} , PV_0 and PV_n , respectively, $P = P_{co}$. $PV_0 = P_{cn}$. PV_n ; so that $P_{co} = P_{cn}$. PV_n/PV_0 ; noting that P_{co} is the desired "corrected" protein concentration to be calculated from the available measurements of the haematocrits and P_{cn} .

The ratio of the plasma volumes can be obtained from the haematocrits using $PV = BV - RBC$ and $BV = RBC/Hct$;

$$\text{so that } PV = RBC/Hct - RBC = RBC \cdot \left(\frac{1 - Hct}{Hct} \right)$$

Substituting the appropriate expressions for the plasma volumes in the above equation allows RBC to cancel out and gives:

$$P_{co} = P_{cn} \frac{\left(\frac{1 - Hct_n}{Hct_n} \right)}{\left(\frac{1 - Hct_0}{Hct_0} \right)} = P_{cn} \frac{Hct_0(1 - Hct_n)}{Hct_n(1 - Hct_0)}$$

To check this equation the "reciprocal" given in row 11 of the table was similarly obtained. The calculated values in rows 10, 11, and 12 of the table show the validity of the equations.

Effects on haematocrit and plasma protein concentration (albumin) of adding saline to a sample of blood

		Starting values					
1	Volume saline added (V) ml	0	1	2	3	4	5
2	Blood volume (BV) ml	5	6	7	8	9	10
3	Red cell volume (RBC) ml	2	2	2	2	2	2
<i>Haematocrit</i>							
4	i fraction	2/5	2/6	2/7	2/8	2/9	2/10
5	ii decimal	0.40	0.33	0.29	0.25	0.22	0.20
6	iii $Hct_n = Hct_0 \frac{BV_0}{BV_n}$	—	0.33	0.29	0.25	0.22	0.20
7	(1-Hct)	3/5	4/6	5/7	6/8	7/9	8/10
8	Plasma volume (PV) ml	3	4	5	6	7	8
9	Protein content (P) mg	120	120	120	120	120	120
10	Protein conc (Pc) g/l	40	30	24	20	17	15
11	$P_{cn} = P_{co} \frac{Hct_n(1 - Hct_0)}{Hct_0(1 - Hct_n)}$ g/l.	—	30	24	20	17	15
12	$P_{co} = P_{cn} \frac{Hct_0(1 - Hct_n)}{Hct_n(1 - Hct_0)}$ g/l	—	40	40	40	40	40

The volumes could be ml or litres, with the corresponding protein content mg or g and the concentration could be expressed as mg/ml or g/l without changing numerical values.

Applying equation 12 to correct observed concentrations of plasma proteins to "O" time (for example, to values prior to cardiopulmonary bypass) would be likely to overcorrect if the time intervals between the "O" and subsequent samples were more than six hours because of the rapid exchange of most plasma proteins between the circulating blood and the tissue spaces.³ This has been observed after haemorrhage.⁴ The original formula, which is inappropriate in vitro is likely to have led to corrections fairly close to those correct in vivo, and which could otherwise be obtained using a computer model⁵ requiring several assumptions. The above formula could be used to obtain rough estimates of the amounts of protein "added" to plasma in vivo by exchange from the tissues and the rate of the exchange.

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Book reviews

Hodgkin's Disease. Ed P Selby and TJ McElwain. (Pp 416; £55.) Blackwells. 1987. ISBN 0-632-01335-4.

This comprehensive account of Hodgkin's disease by an international group of distin-

guished investigators is particularly welcome at a time when considerable progress is being made towards understanding the nature of this enigmatic neoplasm. The scope of the book is impressive, ranging from topics as diverse as the biology of the Reed-Sternberg cell to the psychosocial effects the disease has on its victims. As might be expected advances in treatment, and somewhat ironically the

problems generated by the very success of that treatment, receive particular emphasis but those whose interests lie in epidemiology or special investigative techniques will not be disappointed. In this regard the central importance of accurate pathological diagnosis is properly recognised, even though some recent developments of interest relating to immunohistochemistry and genetic

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arrived too late for inclusion. Nevertheless, this book will undoubtedly become essential reading for all those who wish to know more about the disease, the central mystery of which must now be close to being solved.

FD LEE

A Colour Atlas of Sputum Cytology. The Early Diagnosis of Lung Cancer. G Canti. (Pp 181; £30.) Wolfe Medical Publications. 1988. ISBN 0-7234-0916-1.

There is a dearth of good cytology textbooks and atlases, especially those dealing with common everyday problems. Cytopathology is a rapidly developing field and sputum cytology is an essential part of the routine workload.

The layout of this atlas is excellent, providing detailed information and examples of both normal cells from the respiratory tract as well as every possible variation from inflammatory to neoplastic cells. The superb colour photomicrographs using oil immersion accentuate nuclear details and will do much to persuade cytopathologists to use oil immersion magnifications for difficult cases. A very useful feature, especially for cytotechnicians and trainee pathologists, is the addition of correlating histopathology.

The wide range of examples shown illustrates the author's considerable expertise in the field of respiratory cytology. This book, at its very reasonable price, is a must for every cytology laboratory.

GRACE T MCKEE

Histochemistry in Pathologic Diagnosis. Clinical and Biochemical Analysis. No 22. Ed SS Spicer. (Pp 1064; \$178.50.) Marcel Dekker Inc. ISBN 0-8247-7408-6.

Histochemical techniques have contributed greatly to our knowledge of tissues and pathogenesis. This multiauthor book describes the applications to a wide range of tissues, organ systems, and diseases of the entire gamut from traditional routine and "special" stains through enzyme localisation to the increasingly important methods of affinity cytochemistry with lectins and antibodies. Most authors explain the chemical basis for the techniques and the reasons underlying their use: the emphasis

throughout is essentially diagnostic and practical and many chapters have an appendix of methods. The bibliography is extensive (but only up to 1984) and photomicrographs (monochrome) are abundant and helpful.

Despite variations of style and some inevitable repetition, this weighty compilation of information meets the undoubted need for a critical review of new and established aspects of applied histochemistry and will be of great value and interest to inquiring pathologists in training and in practice, assuming their institutions can afford it.

JM POLAK

The For-Profit Hospital: Access, Quality, Teaching, and Research. Ed RMF Southby, W Greenberg. (Pp 163; \$29.50.) Battelle Press. 1986. ISBN 0-935470-24-7.

Health Care Technology under Financial Constraints: Government Perspectives, Industry Perspectives, Health Care Institution Perspectives. Ed RMF Southby, W Greenberg, B Luce. (Pp 188; \$29.50.) Battelle Press. 1987. ISBN 0-935470-28-X.

These volumes give the reader a vivid insight into the changes in the provision of health care in the US since 1983. Since then anxiety concerning the growth in the national cost of health care, particularly in hospitals, has led to increasing restraint by the federal government and health insurance institutions. Paradoxically, there has been an increase in for profit hospitals at the same time as many non-profit hospitals have found difficulty in surviving financially; even major teaching institutions have considered selling their capital resources and leasing back their hospitals.

The participants in these two seminars were mainly health care managers, health service researchers, and academic health service administrators. Regrettably there appeared to be no practising clinician to record the impact of these financial changes on the patients. Nevertheless, the confusion and insecurity produced by these recent changes are readily apparent in the discussion. Cynical asides such as "PPS can stand for Prospective Payment System or Potential Profit System" indicate the depth of feeling that the new arrangements generate.

The provision of healthcare in the US is multilayered, varying very widely for that

available for the wealthy and for the indigent. There is no equivalent to the NHS which sets a standard for the majority of the country on modest incomes. In both of these volumes the debate is recorded between the demand for managerial efficiency in a free market and the need to make provision for those who cannot meet the cost of health insurance, and suitable provision for teaching and for research. The uncertainties are well expressed by a university Dean of Health Studies: "There is a risk to the health field at an even more fundamental level. In adapting the ways of business management, we may confuse management with institutional leadership. Leadership, on the other hand, is concerned with the promotion of values . . . Ironically, while the business world seems to be discovering the importance of values, we who have a rich tradition of values risk losing ours."

MG RINSLER

Developments in Preventive Oncology. Parts A and B. Ed HE Nieburgs. (Pp 544; \$96.) Alan R Liss. 1987. ISBN 0-8451-4231-1.

These volumes, published in 1986, comprise selected papers from the Sixth International Symposium on Prevention and Detection of Cancer held in 1984. Volume 1 includes experimental carcinogenesis, epidemiology, health education and risk assessment, and Volume 2 (Clinical Oncology) has sections on biomarkers in diagnosis and management, therapy induced changes, and site specific oncology. Reports on cervical screening, cytogenetics, serum markers, receptors, and immunohistochemical studies of markers, receptors, and organ specific antibodies are of particular interest to clinical pathologists.

As the proceedings of a broadly titled symposium these are research and short reviews on specific articles, and are of limited general interest. For specialists, although there is evidence of updating with some 1985 references, the delay in publication means that the review articles tend to be out of date, and that the original work presented may be available elsewhere. These books, however, can be used for reference in the library. They are well produced with clear illustrations and photomicrographs, and a good index. They are also published as volumes 9 and 10 of the journal *Cancer Detection and Prevention*.

C FISHER