the subarctic tundra a breadbasket. Although all these substitutes are theoretically possible, none is as cost efficient as is the less exotic alternative, *viz.* conservation. Therefore, the most cogent argument for conservation is probably also the most prosaic: cost efficiency. If environmental degradation continues pell mell then the costs of transition to other substitutes will sky-rocket. In other words, conservation in the realm of water, biodiversity, topsoil, and the atmosphere is the cost minimisation solution. The Ehrlichs make this point but do not couch it in the rhetoric economists prefer.

Although the book is worthwhile reading for the specialist, it reads as if it were written for the non-specialist. This is no accident. The Ehrlichs have come to the realisation that the only way to save the planet is to persuade the public to take action. The word must get out: overpopulation is our number one environmental problem. The first 200 pages educate the reader that P (population) is the key variable in I = PAT: problems ranging from global warming to forest destruction, famine, and pollution can all be traced back to P. But the Ehrlichs are careful not to depress the readership and to despair. They offer hope. Indeed there is even a chapter entitled "What You Can Do". The short-run suggestions are broad: from small measures like planting trees to grand measures like campaigning against environmentally incorrect legislators. The long-run suggestions are narrow: birth control/planned parenthood and the inculcation of a green ethic. The suggestions are accompanied by a listing of names and addresses of environmental/population organisations and sympathetic politicians. The practicality of "What You Can Do" is refreshing; there is no pretence that this book will survive time. Like the nature we destroy, much of the useful information of this book will be short-lived and dated. This is hardly a criticism; it is a compliment. The book is timely and a must reading now. It will succeed to the extent that the reader does something to lessen the I of I = PAT.

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Safe Blood: Purifying the Nation's Blood Supply in the Age of AIDS *by Joseph Feldschuh with Doron Weber*
(Free Press, New York, 1990), pp. xiv + 218, $US19.95, ISBN 0-02-910065-8.

This book is a good example of the publisher's and printer's arts. It is hard-covered, clearly printed in a legible type face, and has footnotes, a glossary and an index, while each of its eight chapters is referenced. These external characteristics give the work a superficial respectability which does not stand up to critical scrutiny. It is not, as the jacket blurb suggests, "readable yet scientific."

Transfusion transmitted infection has been a recognised hazard of blood transfusion practice for at least 50 years. Successively, the risks associated with syphilis, malaria, hepatitis in its several forms and other more exotic diseases have been recognised, quantified and minimised. No clinician using blood and blood products has been unaware of these risks and has, in the vast majority of cases, made a definitive decision that to withhold blood would expose the recipient to greater risks than those associated with the transfusion itself.

The recognition nearly a decade ago that the human immunodeficiency virus (HIV), the causative organism of the Acquired Immune Deficiency Syndrome (AIDS) was transmissible by human blood and blood products suddenly made the public aware of the potential hazards of what had been seen as a life-saving therapeutic agent.

The AIDS epidemic has spawned its own literature, and this book is part of it. Through books, daily papers and weekly journals and through the electronic media, the public has been made acutely aware of, indeed has been frightened by the spectre of blood-borne disease. For some, sadly, the time frame of a transfusion was critical, and their worst fears have been justified — but not for the majority.

Safe Blood starts out in a logical fashion, and although the language is more often that of the freelance writer than the medical professional, the early chapters cover the uses of blood, the history of the development of transfusion practice, and the relative (or perhaps competing) roles of the voluntary and commercial sectors. Ch. 5 deals with the various infectious diseases known to be transmissible by blood, with Ch. 6 treating AIDS as a special case.

There are flaws apparent in these chapters for the professional reader, even if one might be regarded by the authors as part of the blood banking establishment. In order to make as telling and dramatic a case as possible, the data cited for the relative risks of potentially transmissible infections are worst-case data, and often extrapolated. Further, although there are figures quoted for the increase in syphilis (pp. 89-90), there are no data about the transfusion risk. In more than 30 years of practice, I have never seen a proven case of transfusion transmitted syphilis, although I have seen numerous would-be donors with the disease. To confuse community prevalence with transfusion risk is an unfair and misleading comparison for a lay audience. Another difficulty is that in numerous instances the source of a referenced statement about incidence turns out to be a secondary source, such as a newspaper story or a medical news digest rather than a definitive article in a refereed medical journal.

The authors turn away from the infectious risks of blood and propose that many patients are, by their standards, undertransfused. They take issue with several well-tried and physiologically proven transfusion practices such as haemodilution and conventional storage of the donor's own blood, the technique known as autologous collection. Serious objections can be raised to some of the categorical statements made. For example, the authors interpret the American Food and Drug Administration (FDA) standard period between blood donations of eight weeks as an indication of the risk of volume loss, whereas it reflects the limits of the body's capacity to replace its iron stores. (A person with iron in excess can withstand regular weekly removal of blood for years as a therapeutic measure — it is iron, not the blood volume, which limits the frequency of blood donation).

At last, the purpose of the book starts to become clear. The authors are advocating a programme of long term autologous collection and storage. All their criticisms of conventional haemotherapy are now revealed as means of justifying the long term frozen blood project. In the final chapter, the prototype of this programme is described at length in what amounts to a concentrated sales pitch, including some tables which range from special pleading to the frankly incorrect. It is not until p. 163 that the cost factors emerge. If the authors' proposal is accepted that individuals store at least two units of their own red cells and two units of plasma, the bill for the first year looks like this:

		$ US
Initial testing and processing	($100 per unit) :	200
Storage of red cells	($12 per month) :	288
Storage of plasma	($8 per month) :	192
		680

For the second year, the cost is around $US500. One of the methods advocated for reducing the costs of such a programme is cross-coverage, which may be justifiable on economic grounds, but which is unacceptable on immunological grounds. It would also appear to defeat the purpose of storing autologous blood.

This then is an interesting but irritatingly flawed book which has been slanted in its support of a technology which has been proven and accepted, but one for which the logistics represent an insurmountable hurdle, to say nothing of the financial barrier.

Australian readers will recall the rapid rise and even more dramatic fall of the former Private Blood Bank of Australia, in which shares were parlayed from $A1.50 to $A15 in a three month period in 1987, trading on the powerful and complex emotions of fear and greed. Throughout the reading of this book, one is reminded again of the arguments raised at the time by eminently qualified people to denigrate the conventional blood programmes and their practitioners, and the unsustainable claims made by the proponents of this financially motivated scheme. Katherine Beauchamp, an investigative journalist, has written perceptively: "A voluntary system has much wider goals than a commercial blood bank. Anything . . . . which undermines public trust in a voluntary system has profound consequences for its ability to deliver to the entire spectrum of needy people. The gift relationship between donor and recipient turns upon much more fragile and valuable commodities than the price of shares on a stock market on a given day. It depends upon trust, altruism and a sense of community service."

Safe Blood may be viewed as an attempt to justify an autologous blood programme available only to the well-to-do, by means of selective quotation of risk factors and by unfounded criticism of accepted forms of transfusion practice for which a sound scientific and physiological basis exists. It is not possible to agree with another 'authority' cited on the jacket that "the science is accurate". The glossary contains a number of definitions which would not be acceptable in an undergraduate examination paper (e.g., that for glycerol) and there are some glaring errors in the names of experts in the field (e.g., C. Robert Valeri, correctly named and described in reference 5 to ch. 8 as "one of the pioneers of long-term preservation of blood" appears elsewhere (pp. x and 152) as Edmund Valeri, while Alexis Carrel is Alexi on p.29 and Alexei in the index). Space and editorial constraints prevent a listing of the many professional solecisims which detract from the value this book might well have had for the reader in the transfusion field, as well as for the informed layman.

Perhaps the authors should have the last, revealing word. From the preface (p. xii): "For the record, I would also like to state that to date neither I nor the company with which I am affiliated has made any profit from blood banking.

In fact, we have subsidised our blood service at an extensive cost since its inception five years ago (meanwhile 19 other companies who entered the field have either gone bankrupt or out of business)."

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Glory and Failure: The Difference Engines of Müller, Babbage and Scheutz *by Michael Lindgren (translated by Craig G. McKay)*
(MIT Press, Cambridge, Mass., 1990), pp. 414, $US45.00, ISBN 0-262-12146-8.

1991 is Mozart year; it is also Babbage year: both have their bicentenaries. But whereas Mozart has been celebrated around the world for the past 200 years, Babbage has only recently been promoted to the pantheon. In the UK, 1991 will see numerous Babbage exhibitions, a series of postage stamps, a symposium in Cambridge, and a working exhibit of one of his Difference machines in the Science Museum. He has become accepted as a key figure in the development of the principles of computing, and his Difference Engine and later Analytical Engine are upheld as precursors of the calculator and the computer. Yet for much of his life, and for a long time after his death, Babbage was mocked and his numerous inventions and political posturings ridiculed or neglected.

Although the balance, two centuries after his death, might now be tilted in his favour, there are those who would question central aspects of his accomplishments. After all, his most famous inventions never functioned; his pronouncements on technology and the economics of mechanisation, although representative of a body of opinion at the time, are not particularly original or remarkable; and he became embroiled in several unproductive and rancorous conflicts with colleagues and associates. In total, he might appear to be the paradigm case of the wealthy dilettante, dependent upon craft skills and the ingenuity of those attempting to implement his grandiose ideas within the confines of existing technology.[1]

In his excellent study of the early phases of the development of the difference engines of several devisers, Lindgren avoids either of these extremes, offering ample evidence of a far more complex character. I suspect this is as much to do with the author's background, as with his objectives. By training an engineer, Michael Lindgren is now Curator at the National Museum of Science and Technology in Stockholm. Furthermore, the book developed from his work on a thesis in the field of the history of technology originally concentrating on the difference engines developed by his compatriots Georg and Edvard Scheutz. He is, therefore, able to bring to his topic the expertise of understanding the machinery, the insight of a historian, and the preoccupation of someone keen to resolve a series of complex concerns centering on the disparities surrounding the reception accorded to similar notions in varying contexts.

This well-founded basis allows the author to pose a question with a superficially facile answer; but to avoid any glib conclusion, and instead to make a significant contribution to our understanding of technological development. The question is stated by the author himself:

> How was it possible for the teenager Edvard Scheutz to make a complete difference engine at a negligible cost and with the simplest tools in 1843, while Charles Babbage