Dornhorst A C. The interpretation of red cell survival curves.
Blood 6:1284-92, 1951.
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This paper derives the expected survival of a population of red cells after transfusion. The cells may be normal or abnormal, as may be their post-transfusion environment. The possibilities and limitations of interpreting experimentally observed survival curves were then discussed. [The *SCI*® indicates that this paper has been cited in over 125 publications since 1955.]

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This paper had its origin in my friendship with P.L. Mollison, who was then preparing the first edition of his classic book, *Blood Transfusion in Clinical Medicine.*[1,2] He had done much pioneering work on the survival of transfused red cells, using the exacting technique of differential agglutination. By exploiting antigenic differences, this method allows, after the recipients' cells have been removed by agglutination, a count of the donor cells in a sample of blood. When a patient's red-cell life is reduced, it is possible, by comparing the survival of normal cells in the patient with survival of the patient's cells in a normal subject, to place the abnormality in the patient's red cells or in their environment in his or her circulation.

We had often discussed the interpretation of the resultant survival curves, and I undertook to supply a mathematical analysis for inclusion as an appendix in Mollison's book. For some reason, the publishers did not like this idea, so I decided to seek independent publication. In the paper, I calculated the survival curves that would follow from a number of initial assumptions and considered the inverse problem of interpreting a given curve. Quite different assumptions can give rise to very similar-looking curves, and this limits the scope of interpretation of experimental data. The mathematics involved is quite elementary, but I suppose some mental tenacity was required in thinking through the problem. *Clinical Science* declined the paper — quite understandably, since its editorial policy was to publish only papers with original experimental data — but *Blood* accepted it without demur.

In those days, calculators were mechanical and only capable of the four basic arithmetical functions, so the calculations had to be done longhand. The figures were drawn and lettered by me on graph paper, and looking again at them, I still find them reasonably neat.

I am frankly surprised that the paper has been much cited, since soon after its publication a method of labelling red cells with radioactive chromium was introduced[3] and rapidly ousted the method of differential agglutination. The new method allowed a much less laborious estimate of cell survival, sufficient for most clinical purposes; but, because the label was lost from the cells at a rate not exactly ascertainable, the results did not lend themselves to the type of analysis I had envisaged.

My research has been in respiratory and circulatory physiology, and I have no other publications in haematology. However, I have continued to take an interest in the subject and the *British Journal of Haematology* was kind enough to make me a member of its Editorial Advisory Board.

1. **Mollison P L.** *Blood transfusion in clinical medicine.* Springfield, IL: Thomas, 1951. 456 p.
2. --------------. *Blood transfusion in clinical medicine.* London: Blackwell Scientific, 1983. 988 p.
3. **Necheles T F, Weinstein I M & LeRoy G V.** Radioactive sodium chromate for the study of survival of red blood cells. I. The effect of radioactive sodium chromate on red cells. *J. Lab. Clin. Med.* 42:358-67, 1953.
   (Cited 140 times since 1955.)