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Professor Sir John Dacie,  
Haematology Department,  
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London W12.

Dear John,

I too benefited greatly in my formative years from association with Janet Vaughan as a haematologist. We were both in the Department of Pathology at the London Hospital under Hubert Turnbull FRS. I was the junior dogsbody, Janet the rather rare bird of those days the Research Fellow. I think we both learnt from Turnbull that the paramount factor was care. As in the wards so in the laboratory carefully observe, document, and check, not only the item of interest but everything, irrespective of clock time, or in Turnbull's case personal discomfort (migraine). What Janet added to this, surprising in one mathematically naive, was measurement. She was one of the founders of the school which differentiated the anaemias by the quantifiable factors of cell size, cell diameter, haemoglobin concentration and so forth. This and her other observations made her book, *The Anaemias*, written about them, a classic of its time.

I was not a party to prewar preparation of the wartime blood banks, but got sucked in to the already established system at the outbreak of war in 1939. One can see how the foundation of the system owed much to her drive. What is more remarkable is the part she played in its evolution in practice. Again perhaps surprising is how she, basically a laboratory worker, got out into the field and altered the course of clinical practice in transfusion of blood and blood substitutes in the treatment of 'hypovolaemic shock'.

She went to Somerville College after the war, and I soon followed to Harwell. From that small distance I could not properly evaluate the always delicate domestic problems of the life of that University and the emergent National Health Service. It would seem that she was unable to break into the closed shop of Oxford haematology, a very strong school. Undeterred she turned her thoughts and activities to practical investigational problems of the moment - nuclear energy, civil and military. Only the Americans had had the opportunity to investigate the metabolism and toxic properties of the newly produced man-made radioactive materials. Many of these nuclear fission products and fissile materials, were "bone-seekers". So Janet set about learning the business of bone physiology and pathology. The end products some 25 years later are more classics - her books *The Physiology of Bone* now 2<sup>nd</sup> edition, and *The Effects of Irradiation on the Skeleton*.

Starting with radioactive isotopes of strontium she and her students (mostly girl graduates) built up an impressive record of the metabolism of strontium to be compared and contrasted with that of calcium in the mineral phase of bone. She adopted and developed the techniques of radioautography to contrast the distribution of these alkaline earth elements with that of the rare-earth elements, which comprise an important part of the spectrum of fission products, and the transuranic rare earth elements some of which are fissile. These elements have a special affinity for bone matrix.

This necessitated a deep involvement in the chemistry of the proteins of connective tissue. She and her recruits to this field G. Herring and Maureen Owen (still in this field of research) have made notable contributions in a complex subject.

Her excursions into the pathogenic effects of bone seeking radionuclides have produced the important findings that lesions are likely to occur in those areas which her metabolic studies on bone itself demonstrated were relatively stable and thus not subject to turnover with the loss therefrom of the nuclide of interest. Furthermore the effects need not be on the bone itself but adjacent sensitive tissue - thus carcinomas of the epithelium of the external ear developed from  $^{90}\text{Sr}$  in the adjacent and stable bone of the external meatus. This may well be the model of the observed situation in man where carcinomas of the cranial air sinuses, especially mastoid, have occurred in those bearing  $^{226}\text{Ra}$  in bone.

Her last great contribution before retirement was the development with Betty Bleaney of the technique of fission-track-autography for the finer elucidation of the sites of deposition of plutonium. Here the plutonium atoms are visualised after exposure to neutrons in a reactor and consequent fission. This demonstrated that at early times after the uptake of plutonium the atoms were not only on the surface of bone but in the surface cells (endosteum) and in cells of the adjacent bone marrow where they persist. This finding was, to say the least, unexpected and contentious, so that in many places it was written off as an artefact of a yet imperfectly developed method. However, with the passage of time and considerable improvement on the method the results are confirmed and afforded by similar findings from other methods. The implications are that pathological sequelae are to be expected in marrow as well as bone (and observed as murine leukaemia - Loutit, *Nature* 266 355 1977).

In retirement Janet is tireless. No longer at the bench she has more time to spend in the library. The products of this activity are new books or editions, comprehensive reviews, notably on plutonium and with collaborators, notably Spiers, risk evaluations. Her former student-collaborators apart from those named above are top liners in current research on bone, notably Jennifer Jowsey and radiobiology, Elizabeth Lloyd both in the U.S.A.

Yours sincerely,

J.F. LOUTIT