jected material concentrated in the liver, but it is not quite clear how they arrive at this figure, except by extrapolation from the mice and rat experiments. Our work (*3*), which was carried out at about the same time as Tothill's, using the A_1 ^{131}I-PVP preparation, reports results midway between these two.

Direct measurements were made over the liver; in two patients they were repeated over 13 days and were compared with measurements over a phantom liver in an A.R.L. Manikin. These measurements showed that about 15% of the administered dose is in the liver at 24 hr, and the amount rises to about 22% of the dose at 13 days. Our blood clearance obtained on one patient only—33% at 24 hr and 18% at 48 hr—was slower than reported.

Our general conclusions were similar to those of the authors, but we found the liver uptake to be higher. About half the dose is excreted fairly rapidly, about 20% is taken up more slowly by the liver and some seems to remain circulating in the blood and is slowly excreted. Our estimate for the radiation dose to the liver was 0.02 rads/μCi.

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3. HOULDER, A. E., MANNING, G. AND MCALISTER, J. M.: The use of iodine-131-labelled P.V.P. in brain scanning. *Brit. J. Radiol.* **38**:718, 1965.

COMMENT BY TOTHILL ON PVP

Miss McAlister has kindly shown me a copy of her letter so that I am able to supplement, rather than duplicate, her contribution. Hulme *et al* say that they cannot confirm my deduction that most of the retained ^{131}I-PVP is in the liver. It does not seem to me that the evidence they present leads to this conclusion. They confirm my findings that approximately 50% of the A_1 material is retained for a long period and that less than 1% of the administered dose is in the plasma after 4 days. If the same concentration is maintained in extravascular, extracellular space, only a few percent of the dose are accounted for. Where then is the rest?

The means at my disposal at the time of the investigation for determining sites of concentration were rather crude, and it may well be that there was significant localization in, for example, the spleen. As I pointed out in the original paper, concentration in other organs of the reticuloendothelial system would lower the dose to the liver. The reduction factor is likely to be less than two, and not ten as Hulme *et al* suggest. It may be that a rat's liver retains only 5% of the dose, but, sir, I am not a rat!

I agree that, whatever the degree of organ concentration, the radiation dose arising from the amounts used in investigating renal function or protein-losing enteropathy is quite acceptable; my earlier paper aimed to draw attention to the possible high doses arising from the administration of 500 μCi for brain scanning.

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THE AUTHOR'S REPLY

The human data reported in our paper are very similar to the findings of Tothill and markedly different from those of Miss McAlister. The sites of storage of polyvinylpyrrolidone (PVP) are within the reticuloendothelial system and the point of dispute is the proportion of material located within the liver. We quote a value of 5% of the injected material within the liver by extrapolation from animal experiments, confirming the findings of Ravin *et al* who investigated ^{14}C-PVP and, at autopsy, they found 4% of the injected material located within the liver (Table 3, Ref. *1*) and 1.3% within the spleen.

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REFERENCE

1. RAVIN, H. A., SELIGMAN, A. M. AND FINE, J.: Polyvinylpyrrolidone as a plasma substitute. Studies on its excretion, distribution and metabolism. *New Engl. J. Med.* **247**:921, 1952.