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THE AUTHOR'S REPLY

In relation to the comments on our recent publication, we should like to record the following observations.

The comments on the size of sulfur colloid particles and general observations about colloids are well recognized.

The possibility of flocculation during or after injection for reasons based on the instability of particle size does not seem a likely explanation as this phenomenon is observed so infrequently and other patients injected from the same batch of colloid fail to exhibit lung uptake. The available evidence would suggest that this phenomenon is related to the condition of the patient rather than of the colloid.

We agree that kits for the production of antimony sulfide colloids provide a simple method of obtaining a satisfactory liver scanning agent; however, in defense of those who produce their own sulfur colloid I would point out that the three simple chemicals required, namely, hydrochloric acid, sodium thiosulfate, and phosphate buffer are readily available at minimal cost in most hospitals.

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DEADTIME LOSSES

This letter is written in reference to the Concise Communication—"Unexpected Deadtime Losses in a Modified Rectilinear Scanner System" by Philip Cooper, et al (*1*). The authors have presented data and calculated deadtime correction factors that appear to deviate from a theoretical calculation of correction factor versus observed counting rate. No attempt was made to explain the wide deviation, and a set of empirical equations are derived to represent the correction factors thus found. These equations have, however, no physical basis. If the data are analyzed to obtain the system deadtime using the familiar equation:

$$R_{true} = \frac{R_{obs}}{1 - R_{obs}\tau}$$

where R_{true} is the true counting rate, R_{obs} is the observed counting rate, and τ is the system deadtime, then one finds that the data can be fit essentially with a deadtime of approximately 170 μsec. This sets a saturation counting rate at approximately 360K cpm and gives a curve with the shape of that given for the experimental data. If the deadtime of the multichannel analyzer is 32 μsec as stated, then the rest of the system must be the limiting factor with an inherent deadtime of about 170 μsec.

The actual operation of the analyzer in the reported study is somewhat difficult to ascertain from the paper. A few comments on the possible ways of using an analyzer for such studies is in order and from this an insight into the reported use may be gained. Modern multichannel analyzers (MCAs) operate in two modes, analog (PHA) and multiscale (MCS), and both modes can be used to some degree to obtain quantitative data from instruments such as scanners.

In the PHA mode an analog voltage from a position-sensitive potentiometer can be fed to the analog input and a signal from the scanner SCAs can be fed into the coincidence/sample input. The analog input is sampled on command by the signal from the SCA. A count is then added in the memory channel that corresponds to the position of the scanner at the time of the valid SCA pulse output. In this manner a histogram is obtained of counts versus scanner position. Readout of the memory must be performed at the end of every pass and a composite image reconstructed at a later time. Using a nuclear ADC in this