shadow on the ingestion of a meal is due not to evacuation of the gall bladder, but to increased resorption of the dye. However, our results show that the ingestion of a number of meals with the common duct tied does not cause a decreased density nor a disappearance of the shadow. The only way to explain adequately the disappearance of the shadow in the dog 2 or 3 hours after a meal of egg yolk or within an hour after the injection of cholecystokinin is that most of the gall bladder contents leave via the biliary passages. In view of the mass of data in the literature on man, the cat and the dog showing that the gall bladder can evacuate, one cannot avoid accepting the foregoing explanation as a proven fact for these animals.

The results on the second question demonstrate that in obstructive jaundice in the dog the gall bladder does not visualize in a normal manner in that it is slow in visualizing and the density of the dye does not develop to the usual extent. This result is not surprising in view of the fact that the formation of bile is decreased in obstructive jaundice. Recently Rudisill[3] has found that the gall bladder of man may visualize in certain types of jaundice. Rudisill also found that in jaundice in man the toxicity of the dye is not increased, which we have confirmed in the dog.

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Protein Digestion in the Human Stomach.

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The primary function of the stomach being to digest protein, it would be desirable to be able to determine the actual accomplishment of the stomach in health and disease as far as protein digestion is concerned, instead of relying on acidity determinations as an indication. Determinations of the ratio of soluble to insoluble protein in gastric contents following a test meal might give useful information provided that the gastric contents remained a uniform suspension, and provided solid and liquid left the stomach at the same rate. On the other hand, if insoluble iron oxide were mixed with the flour and baked into the bread used as a test meal and if this oxide adhered to the undissolved portion of the gastric contents,

[3] Rudisill, H., *J. Am. Med. Assn.*, 1930, **95**, 1425.

the ratio of undissolved protein to iron would enable one to determine the percentage of protein of the test meal that had been put in solution by the gastric juice, and such a result would be fairly accurate whether or not there were stratification of gastric contents or selective evacuation of the stomach. This method should also provide a check on the significance of results of acidity determinations and of the use of the simple ratio of dissolved to undissolved protein in gastric contents.

Twenty-four normal men were given test meals consisting of 80 gm. of bread (made from flour containing 0.25% of red iron oxide) and 200 cc. of water. Twenty-five cc. portions of gastric contents were aspirated at 15 minute intervals (beginning at 30 minutes) until the stomach was empty. Determinations were made of dissolved protein (by centrifugation of contents and washing of the residue), of total protein, of undissolved protein, of iron, of pepsin and of free and total acidity. From this data the percentage of protein dissolved through gastric action was estimated from the ratio of dissolved to undissolved protein, and from the ratio of iron to undissolved protein. The percentage of protein dissolved ran in most cases from 60-90% with the highest values usually in the third specimen. Usually similar results were obtained by either method of calculation, but in certain cases the first method gave lower results, indicating that some stratification had occurred and that the protein:iron ratio was more dependable. Both methods were inaccurate when the stomach was practically empty. A general parallelism existed between the results on protein digestion and the acid and pepsin determinations. The iron ratio method appears to give the best estimates as to the effectiveness of the stomach in protein digestion and thus to be useful in checking other procedures. The chief difficulty in the way of expressing the protein digesting power of the stomach in a definite figure lay in the fact that the evacuation time of the stomach varies so much in normal and pathological conditions that analysis of the gastric contents at any selected time after ingestion of a test meal can not be depended upon to indicate the high point of gastric digestion in all cases. This is particularly true in cases of hypoacidity where gastric evacuation is often much hastened. This may be overcome by making analyses at intervals, but this makes the method at present too laborious for clinical use.