moved to prevent a return flow of blood. The site of the puncture is then cleansed with alcohol. The entire procedure requires little more time than an average estimation of arterial blood pressure. We have noted no major technical difficulties nor significant sources of error.

The venous pressure in a series of 40 normal individuals varied between 4 and 10 cm. with most of the figures ranging between 6 and 8 cm. The determination has been applied largely to patients with hypertension, pneumonia or congestive heart failure. It has not seemed necessary to take readings oftener than once daily, except in the most severe cases, in which a second observation has been made only after venesection or after the removal of pleural transudate. Otherwise observations have been made at intervals of 1, 2 or 3 days.

In a series of over 200 readings, we have not been confronted by any difficulties from traumatism by the needle and have not been obliged to resort to other veins than those at the elbow. The amount of blood lost during a reading—1-3 ml.—is negligible. We have not encountered any instances of clotting in the vein. Our experience leads us to believe that this method possesses simplicity, reasonable accuracy and freedom from error of a personal nature.

We are grateful to Dr. A. J. Bruecken for the preparation of the photograph and to Mr. C. F. Thilo for the drawings.

5015

Utilization of Calcium Soaps by the White Rat.

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The formation of calcium soaps in the intestine has been accepted by many authors as being fatal to calcium and fatty acid absorption (Givens,[1] Bosworth,[2] Telfer,[3] et al.). On the other hand Holt, Courtney and Fales[4] found evidence that calcium was better assimilated by infants when the diet contained a liberal amount of fat.

[1] Givens, M., and Mendel, L. B., J. Biol. Chem., 1917, xxi, 421.

[2] Bosworth, A. W., Bowditch, H. I., Giblin, L. A., Am. J. Dis. Children, 1918, xv, 397.

[3] Telfer, S. V., Quart. J. Med., (Oxford), 1922-23, xvi, 45.

[4] Holt, E., Courtney and Fales, Am. J. Dis. Children, 1918, xvi, 52.

Oelsner and Klinke[5] have demonstrated that ox-gall *in vitro,* readily dissolves a mixture of calcium soaps obtained from the insoluble fatty acids of butter fat. They further found that these calcium soaps were converted into sodium soaps by the action of sodium carbonate and bicarbonate, varying in amount from 8.6% to 19.5% under the conditions of concentrations used and at 37°C. That the bile salts play an important rôle in the absorption of fatty acids and their calcium soaps was shown by Adler.[6]

We have studied the utilization of various calcium salts, using the white rat as the experimental animal. The length of the periods was 18 days in most instances.

The ration fed consisted of: Casein, 18%; mineral salts, 3%; sucrose, 35%; starch, 36%; calcium soap, 4 or 8%. Two-tenths of a gram of yeast and two drops of cod liver oil were given daily. The casein was a low calcium product (0.019% CaO) obtained from the Harris Laboratories, Tuckahoe, N. Y.; Osborne-Mendel[7] salts, modified by the omission of calcium, supplied the other minerals. The calcium soaps were prepared by the method of Harrison[8] from fatty acids of tested purity obtained from the Eastman Kodak Co. The mixed soaps used were prepared from the mixed fatty acids of lard. There was very little neutral fat in the ration, most of which came from the cod liver oil and the yeast, except where lard (10%) was added to the calcium palmitate and the mixed soap rations. The rats used were males about 35 days of age weighing approximately 65 gm. each. The neutral fats, fatty acids and soaps of the feces were determined by the modified Roese-Gottlieb method, as used by Holt, Courtney and Fales.[9]

If calcium soaps are absorbed as undissociated salts there should be perfect agreement between the rates of absorption of the fatty acid radicle and that of the calcium atom. This perfect agreement seems to be substantially found with calcium oleate where both the calcium soaps and the fatty acid radicle were absorbed to the extent of about 90%. With calcium stearate, however, the situation was different, the calcium soaps of the feces being about 30% less than that of the free fatty acid. However, if we assume that the feces contained 30 mg. of free fatty acids per day derived from bile, bacterial residues, etc., then the utilizations of the calcium and the stearic acid in calcium stearate appear to be equal. Since the feces

[5] Oelsner, A., Klinke, K., *Jahrb. Kinderheilk,* 1928-29, cxxii, 58.

[6] Adler, E., *Arch. Verdauungs-krankh.,* 1927, xl, 174.

[7] Osborne, T. B., Mendel, L. B., *J. Biol. Chem.,* 1918, xxxiv, 131.

[8] Harrison, G. A., *Biochem. J.,* 1924, xviii, 1222.

[9] Holt, E., Courtney and Fales, *Am. J. Dis. Children,* 1919 xvii, 38.

contained about 30 mg. of free fatty acids per day when the diet contained no calcium soaps it seems reasonable to assume that approximately that much fecal free fatty acids had an origin other than from the calcium soaps of the diet. On the whole, therefore, our results are in agreement with the idea that calcium soaps are absorbed without undergoing previous decomposition or hydrolysis. Calcium butyrate, being very soluble was readily assimilated. Since the feces on this diet contained large quantities of calcium carbonate, it is likely that the calcium, above the requirements for bone formation, was excreted into the intestine as the carbonate. The urine after feeding calcium butyrate showed a relatively high calcium content.

The storage of calcium on the calcium lactate ration was 51 mg. CaO per rat per day; on calcium butyrate, 41-45 mg.; on calcium palmitate, 26-35 mg.; on calcium oleate, 24-32 mg.; and on calcium stearate 16-23 mg. per day.

*Conclusion.* Calcium palmitate soap was utilized to the extent of 38 to 66%; calcium oleate 90 to 91%; mixed calcium soaps from lard, 70-75%. Calcium stearate was rather poorly utilized, 25 to 45% of the soap disappearing from the intestinal contents.


### 5016

### Experimentally Induced Intermenstrual Bleeding in Ovariectomized Monkeys.

WILLIAM PAUL MADDUX. (Introduced by Edgar Allen.)

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Recently Hartman[1,2] has reported the occurrence of intermenstrual bleeding in the monkey *(Macacus rhesus)*. This usually appears between the 11th and 14th days of the menstrual cycle. Ovulation in the monkey, as checked by recovery of ova from the uterine tubes, occurs between the 10th and 14th days (Corner[3] and Allen[4]). By means of exploratory laparotomy Hartman was able to correlate this phenomenon with changes in the ovary. His observations led him to believe that this interval bleeding was a nor-

1 Hartman, Carl G., *Science*, 1928, lxviii, 452.

2 Hartman, Carl G., *J. Am. Med. Assn.*, 1929, xcii, 1992.

3 Corner, George W., *Carnegie Pub.*, Contrib. to *Embryol.*, 1923, xv, 75.

4 Allen, Edgar, *Carnegie Pub.*, Contrib. to *Embryol.*, 1927, xix, 1.