radioactive sulfur. The radioactivity of the sodium sulfate was about ⅔ of that of the methionine.

After a period of 5 weeks, cystine was isolated from the hair, skin, or the whole carcass of the animals by hydrolysis of the protein, precipitation of the cystine as the cuprous mercaptide, and purification by reprecipitation. The amino acid was finally obtained in pure crystalline form. It was then converted into barium sulfate.

The radioactivities of the barium sulfate samples were kindly measured by Dr. W. F. Libbey with the aid of the screen wall Geiger counter.

The cystine isolated from the hair of rats 20 and 22, the skin of rat 20, and the whole carcass of rat 24 contained radioactive sulfur. The radioactivity of the cystine isolated from the whole carcasses of rats 32, 34, and 37 was zero within the error of measurement.

The data show that some of the S^{35} contained in the methionine appeared in the protein cystine of the experimental animals. None of the radioactive sulfur contained in the sodium sulfate was found in the form of cystine.

The use of the sulfur isotope, S^{35}, affords a convenient method of studying sulfur metabolism in animals. Further work in this field is in progress.

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Effect of Choleic Acid of Vitamin K on Prothrombin Levels of Bile Fistula Rats.*

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Abundant evidence[1] is now available that administration of vitamin K to vitamin K-deficient chicks and to bile fistula animals leads to an increase in the prothrombin level and a decreased clotting time of the blood. Administration of deoxycholic acid is necessary to insure absorption of the antihemorrhagic factor when it is given orally to bile fistula animals.

It was suggested by one of us[1] that, since vitamin K combines with

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1 Schmidt, C. L. A., *Pac. Coast Med.*, 1938, **5**, 7.

TABLE I.

Rat No.	Days after operation	Dose of choleic acid mg per 100 g	Blood sample taken after administration of choleic acid hr	Prothrombin values before and after administration of choleic acid
1	21	10	2.5	10-50
2	29	20*	4 †	20-50
3	13	20*	4 †	25-50
4	38	20	6.5	25-39
			24	30
5	16	10	3	17-20

* Two 10 mg doses with 24-hour interval.
† Hours after last dose was administered.

deoxycholic acid, possibly the best method of administering this vitamin orally would be in the form of the choleic acid. This compound has recently been prepared by Almquist and Klose.[2] They showed that oral administration of the choleic acid to vitamin K-deficient chicks leads to a decrease in the clotting time of the blood. The present experiments indicate that oral administration of this choleic acid to bile fistula rats is followed by an increase in the prothrombin level of the blood.

The choleic acid was kindly supplied to us by Dr. Almquist. It was fed in varying levels to choledochocolonostomized rats. The data are given in Table I.

Although the oral administration of the choleic acid of vitamin K led to an increase in the prothrombin value of all of the bile fistula rats, the prothrombin values are below normal. It may be necessary to give larger doses in order to increase the prothrombin levels further. Experiments to determine the optimum dose of the choleic acid are in progress.

2 Almquist, H. J., and Klose, A. A., *J. Am. Chem. Soc.*, 1939, **61**, 745.