creatinine, 89.1. The average creatinine/xylose ratio was 1.74, and the average urea/xylose ratio was 0.684. The creatinine/xylose ratio for man (1.74) is thus somewhat higher than was reported for the dog (1.40). Accepting the xylose clearances as measuring the glomerular filtrate, it appears that a considerable quantity of creatinine is removed from the blood by some mechanism other than glomerular filtration, amounting to about 75% of the filtered creatinine, or 43% of the total creatinine excreted. It is inferred that this moiety is removed from the blood and excreted into the urine by tubular secretion.

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Metabolism of d- and l-Methionine.

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(Introduced by Arthur H. Smith.)
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Previous investigation of the physiological rôle of methionine in the animal organism led the writers to conclude that "methionine, like cystine, is capable of unmistakably stimulating growth in albino rats subsisting on a basal diet poor in cystine.[1, 2] It was pointed out[2] that this observation immediately raised various questions relative to the intermediary metabolism of methionine. Referring to one of these problems, we stated: "It is obvious, of course, that, since the addition of methionine (*dl*) to the diet of animals subsisting on the regimen previously described leads to growth stimulation, the study of the physiological behavior of . . . . . the separate optically active forms of methionine becomes important." These compounds have been investigated with the following results.

Methionine was synthesized and resolved according to the methods of Windus and Marvel.[3, 4] *d*-Methionine as well as the naturally occurring *l*-methionine stimulates growth in the rat ingesting our cystine-methionine deficient diet. (*cf.*, the results of similar experi-

[1] Jackson, R. W., and Block, R. J., *Science*, 1931, **74**, 414.
[2] Jackson, R. W., and Block, R. J., *J. Biol. Chem.*, 1932, **98**, 465.
[3] Windus, W., and Marvel, C. S., *J. Am. Chem. Soc.*, 1930, **52**, 2575.
[4] Windus, W., and Marvel, C. S., *J. Am. Chem. Soc.*, 1931, **53**, 3490.

ments on tryptophane and cystine.[5, 6, 7, 8]) The formyl derivatives of the 2 optical isomers of methionine also were tested. The administration of formyl *l*-methionine causes increments of body weight similar to those produced by both *l*- and *d*-methionine. On the other hand, formyl *d*-methionine apparently cannot be utilized by the animal organism for growth under the conditions of our experiments. Analogous observations have been made on the physiological availability of the acetyl derivatives of *d*- and *l*-tryptophane.[6]

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Anterior Pituitary and Lactation.

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By injection of the anterior-pituitary-like hormone (A.P.L.) of pregnancy urine Evans and Simpson[1] were successful in producing marked development of the mammary glands in virgin rats, but were unable to produce milk secretion; Bradbury[2] obtained similar results in mice. We have confirmed these results by histological examination, which shows that no secretion takes place in the glands, although the alveoli are as numerous as in late pregnancy. We further observed that the development of the mammary gland in these animals runs parallel to the increase in the weight of their ovaries.

We found, however, that removal of the intensely luteinized ovaries of these rats will lead to abundant milk secretion in their mammary glands within 36 hours (13 experiments, all positive). We further observed that if the pituitary was removed simultaneously with the ovaries, milk secretion did not set in (4 experiments).

These experiments seem to indicate that removal of the luteinized ovaries will lead to milk secretion in the fully developed mammary

[5] Berg, C. P., and Potgieter, M., *J. Biol. Chem.*, 1932, **94**, 661.

[6] du Vigneaud, V., Sealock, R. R., and Van Etten, C., *J. Biol. Chem.*, 1932, **98**, 565.

[7] Lawrie, N. R., *Biochem. J.*, 1932, **26**, 435.

[8] du Vigneaud, V., Dorfmann, R., and Loring, H. S., *J. Biol. Chem.*, 1932, **98**, 577.

[1] Evans, H. M., and Simpson, M. E., *Am. J. Physiol.*, 1931, **98**, 511.

[2] Bradbury, J. T., PROC. SOC. EXP. BIOL. AND MED., 1932, **30**, 212.