

TABLE I.
Record of 3 Lactations Induced by the Simultaneous Administration of Diethylstilbestrol and Thyroprotein to Thyroidectomized Cows Following 30 Days Previous Treatment with Thyroprotein.

A26 Experiment 5		A26 Experiment 10		1944	823
	Milk (lbs.)	1944	Milk (lbs.)		Milk (lbs)
1943		May 13 da.	51.1	June	9.1
Feb. 19 da.	36.4	June	129.2	July	163.4
Mar.	255.9	July	197.8	Sept.	222.8
April	304.3	Aug.	370.0		
May	286.0	Sept.	432.1		
June	189.0				
July	206.0				
Aug. 3 da.	16.1				
	1294.0				

inanutition in the rat.

Summary. In the thyroprived cow with pronounced myxedema no mammary development was obtained by diethylstilbestrol or thyroprotein administration. Negative results were also obtained with the simultaneous administration of these two substances as long as myxedema persisted. Substantial mammary development and lactation resulted from diethylstilbestrol administration following recovery from myxedematous symptoms by thyroprotein therapy. It is suggested that the

failure of mammary development in the myxedematous animal is due to some phase of the myxedema and that the response obtained following thyroid therapy is not due to a synergistic action of thyroxine and diethylstilbestrol.

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Urethane Administration and Potassium Content of Bronchial Secretions in the Cat.

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During the course of studies upon the chemical composition of respiratory tract fluid (R.T.F.), part of which has been published,^{1,2} it has been found that the potassium content of these bronchial secretions is higher in cats under urethane anesthesia than in decerebrate cats. This observation is of coincidental interest because (a) potassium has been

found generally^{3,4,5,6} though not always⁷ related in some obscure manner to sympathomimetic activity; (b) urethane has been reported

¹ Perry, W. F., and Boyd, E. M., *J. Pharm. and Exp. Therap.*, 1941, **73**, 65.

² Boyd, E. M., Jackson, S., MacLachlan, M., Palmer, B., Stevens, M., and Whittaker, J., *J. Biol. Chem.*, 1944, **158**, 435.

³ Camp, W. J. R., and Higgins, J. A., *J. Pharm. and Exp. Therap.*, 1936, **57**, 376.

⁴ Brewer, G., Larson, P. S., and Schoeder, A. R., *Am. J. Physiol.*, 1939, **126**, 708.

⁵ Larson, P. S., and Brewer, G., *J. Pharm. and Exp. Therap.*, 1937, **61**, 213.

⁶ Brewer, G., and Larson, P. S., *J. Pharm. and Exp. Therap.*, 1938, **63**, 272.

⁷ Seager, L. D., *J. Pharm. and Exp. Therap.*, 1939, **66**, 202.

to relax bronchial muscles and to be useful in the therapy of bronchial asthma,⁸ and (c) potassium salts have been found to be effective in the treatment of bronchial asthma by some (*e.g.* ⁹) but not by others (*e.g.* ¹⁰). These various observations would suggest the possibility that urethane relaxes the bronchial muscles of Reisseissen by setting free in the respiratory tract potassium ion which, by virtue of its sympathomimetic activity, relaxes these muscles.

The experiments were performed upon 32 healthy, adult cats, 17 of which were decerebrated and 15 urethanized by a parenteral injection of 1 g of ethyl carbamate per kilo body weight. The animals were arranged for collection of R.T.F. by the method of Perry and Boyd,¹ as modified by Boyd, Jackson, and Ronan.¹¹ The volume output of R.T.F. was identical in the 2 groups of animals and averaged about 2 ml per kilo body weight per 24 hours. The R.T.F. excreted during the first 3 hours, from the 4th to the 12th and from the 13th to the 26th hour, was separately analyzed for potassium by the method of Hoffman,¹² the results being expressed as mg of potassium per 100 ml of R.T.F.

TABLE I.

Mean Potassium Content of R.T.F., Expressed as mg per 100 ml, in Urethanized and Decerebrate Cats.

Hours of collection of R.T.F.	Urethanized	Decerebrate
1 to 3	28	5.6
4 to 12	18	9.2
13 to 26	36	8.1
Mean	27	7.6

⁸ Farmer, L., *J. Lab. Clin. Med.*, 1939, **24**, 453.

⁹ Bloom, B., *J. Am. Med. Assn.*, 1938, **111**, 2281.

¹⁰ Miller, H., and Piness, G., *J. Am. Med. Assn.*, 1940, **114**, 1742.

¹¹ Boyd, E. M., Jackson, S., and Ronan, A., *Am. J. Physiol.*, 1943, **138**, 565.

¹² Hoffman, W. S., *J. Biol. Chem.*, 1937, **120**, 57.

The results have been averaged and the mean values are given in Table I. It is obvious that the output of potassium is considerably greater, on the average 3 to 4 times as great, in the R.T.F. of the urethanized than of the decerebrate cats.

There remained the possibility that urethane, by increasing the concentration of serum potassium, caused an increased output of potassium in the R.T.F. Anesthesia has in general been found associated with a fall in the level of serum potassium, although in species with large amounts of potassium in the red blood cells, hemolysis may complicate the results and give false high values for serum potassium during anesthesia.¹³ To investigate this possibility, we analyzed the serum potassium of 8 cats under urethane anesthesia, taking blood by cardiac puncture at 3-hour intervals. The initial pre-anesthetic concentration of serum potassium averaged 21.5 mg per 100 ml of serum; at 3 hours, the average value was 19.0 mg, at 6 hours it was 17.8 mg, and at 9 hours it averaged 19.9 mg per 100 ml. These results are in conformity with those previously published in demonstrating that anesthesia produces a slight fall in the concentration of serum potassium and obviously could not be used in any way to explain the changes found in the potassium content of R.T.F.

Summary. The potassium content of respiratory tract fluid was found to average 7.6 mg per 100 ml in decerebrate cats, and 27 mg per 100 ml in urethanized cats. The results could not be related to serum potassium, the level of which declined slightly during urethane anesthesia; it is suggested that they may have some relation to the reputed value of urethane in bronchial asthma and the sympathomimetic action of potassium.

¹³ Robbins, B. H., and Pratt, H. A., *J. Pharm. and Exp. Therap.*, 1936, **56**, 205.