phosphate, adenosine diphosphate, adenosine triphosphate, diphosphopyridine nucleotide, or triphosphopyridine nucleotide in combination with pyruvate resulted in an increase in HA, though they were without effect when tested individually as the sole carbon source. Results with arabinose, lactate, acetate, adenine, adenosine, glutamine, gluconate, fumaric acid, cis-aconitic acid, isocitric acid, malic acid, succinic acid, ketoglutaric acid, or oxalic acid were negative when tested as a sole carbon source and in combination with pyruvate.

Discussion. The data in Tables I and II suggest that propagation of strain NWS in cells of the chorioallantoic membrane may require nucleotides or carbon sources not supplied by cells in the pyruvate medium, which nevertheless support growth of the parent strain. The difference in requirements between strains NWS and WS may or may not be a variation associated with neurotropism. This can only be determined after the growth of other influenza strains on CamTC in pyruvate and glucose has been studied. It is believed that with CamTC in a pyruvate medium adsorption and penetration of strain NWS is possible but viral synthesis is markedly reduced. Diphosphopyridine nucleotide (coenzyme I) with pyruvate in CamTC had a greater effect on virus multiplication than triphosphopyridine nucleotide (coenzyme II) which might suggest greater specificity for coenzyme I. Possibly a coenzyme I linked reaction is indicated.

Summary. Chorioallantoic membrane tissue cultures (CamTC) in balanced salt solution (BSS) with pyruvate as the sole carbon source supported synthesis of influenza virus (strain WS) but not its neurotropic variant (strain NWS). Various other substrates were studied alone and together with pyruvate for their effect on synthesis of strain NWS in chorioallantoic membrane. Cells maintained in BSS containing glucose, xylose, or glycerol as the sole carbon source supported viral synthesis, while cells maintained in ribose, dihydroxyacetone, glycerophosphate, adenosine-5 phosphate, adenosine diphosphate, adenosine triphosphate, or diphosphopyridine nucleotide supported viral synthesis only in combination with pyruvate. It is suggested that synthesis of strain NWS in CamTC requires nutritional factors which are not supplied by cells maintained in a medium with pyruvate as the sole carbon source.

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Role of Mammary Glands on Weight of Suckling Rats. (22717)

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In nutritional studies there is a great need for employing rats showing uniformity in weight. In the weanling rats reared in these Laboratories it has not been possible to obtain appreciable uniformity in weights. The individual variation was considerable although the average weaning weight of animals born during different periods remained fairly constant.* It is now known(1) that the weaning weight of rat is influenced by the following factors: (a) the number of young the mother suckles, (b) the position of the litter in litter series, (c) the nature of the diet. While studying these aspects, it was noticed that

* Unpublished data.

TABLE I. Relationship between "Functional" Mammary Glands and 14th Day Weight of Offsprings.

No. of functional mammary glands	8	9	10	11	12
No. of females	30	46	78	37	30
14th day wt of 6 young (g)	124.3	128.4	132.3	140.0	139.1
S.E.	2.69	2.93	2.10	2.88	2.99
Avg birth wt of 6 young (g)	29.91	30.11	30.16	30.30	30.37
S.E.	0.212	0.211	0.398	0.389	0.363

there was some relationship between the number of well developed mammary glands of the lactating female and the weaning weight of the young. The present communication attempts to show this relationship.

Material and method. Albino rat mothers from the stock colony between the ages of 5 and 12 months, each nursing 6 young ones, were randomly selected. On the 14th day, a careful examination of their mammary glands was carried out, and the number of teats being suckled by the young ones noted. Normally, a female rat possesses 6 pairs of teats, 3 in the thoracic and 3 in the abdominal region. The teats which contain milk project prominently due to frequent sucking by the young. It is possible to exude milk from these "active" or "functional" nipples when they are gently squeezed, while those not prominent appear to be completely devoid of milk. The milk containing glands are easily distinguishable from those not containing milk as the former besides projecting prominently are marked by a circular hairless area immediately around it. On the 14th day when the number of active mammary glands was counted the body weight of young also was recorded. The reason for weighing the young on the 14th day instead of on the weaning day, *viz.*, 21st day, is that up to this day the young are known to be entirely dependent upon the mother's milk(2). Any variation in their weights at this time could be taken as a criterion of the lactating capacity of the mother rat.

Results. Relation between number of mammary glands and weight of young rats: Table I shows that the total weight of 6 young on the 14th day increases correspondingly with the increase in the number of "active" mammary glands. This is found to be statistically significant. The trend can be

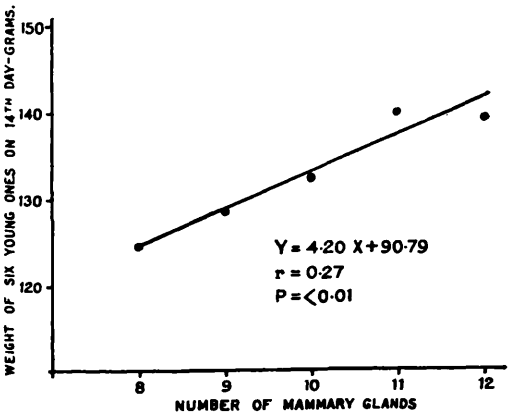

FIG. 1. "Functional" mammary glands and body wt of young.

best described by a linear regression Y = 4.20 x +90.79, as depicted in Fig. 1. It is quite likely that the birthweight and the position of the litter series may to some extent determine the 14th day weights of young although the experimental evidence does not substantiate this, as is evident from Table I. This is what should be expected, since while the 14th day weight is dependent upon the available milk from the mother and probably the number of "functional" mammary glands, the average birth-weight is dependent upon the weight, general condition of the mother and the position of the litter series.

Number of mammary glands and position of the litter series: It has been observed in these Laboratories that the weaning weight of rats shows an increase with the order of birth. In order to investigate whether the above fact could be attributed to a corresponding increase in the number of functional glands, the data collected on the same 221 female rats were regrouped according to the order of birth, and summarized in Table II. It is clear from Table II that the average 14th day weight of the young born in the first lit-

TABLE II. Relationship between Litter Series, 14th Day Weight of Young and Number of "Functional" Mammary Glands.

Position of litter series	I	II	III	IV
No. of females	89	59	39	34
Avg No. of functional glands	9.6	10.2	10.3	10.2
S.E.	0.12	0.17	0.17	0.20
Avg wt of 6 young on 14th day (g)	122.5	137.5	143.1	138.3
S.E.	1.59	2.30	2.69	3.14
Avg birth wt of 6 young (g)	29.35	30.28	31.38	30.71
S.E.	0.223	0.173	0.696	0.243

ter was the lowest as compared to the weights of those of the subsequent series. The average 14th day weight of 6 young born in the third order of birth was the highest. It is interesting to note that the average number of "active" mammary glands in the females of the first group was the least. It may seem, therefore, that there is a correlation between the number of "active" mammary glands and the position of litter series.

Discussion. The wide variation in the weights of young rats from different litters has been mainly due to the maternal milk supply. A closer study revealed that there was a linear relationship between the number of "milking" mammary glands of the mother rats and weights of their offspring. Actually it is possible to explain on the basis of the number of "active" or "milking" mammary glands the observed differences in the weaning weights of young born in the different order of birth. It should, however, be admitted that a corresponding study of milk yield of the lactating mothers would have been of considerable importance, but certain technical difficulties did not permit of extensive studies being made on this aspect.

Summary. An attempt has been made to determine the cause(s) for variation in weight of suckling rats. It was found that the 14th day weight of rats did depend upon the number of "milking" glands of the mother rats. The average 14th day weight of young born in the first litter was lowest when compared with the weights at corresponding periods of those delivered in the subsequent litters. The average number of "functional" mammary glands of mothers nursing their first born was also the lowest as compared with those of mothers rearing their second, third and fourth litters.

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Essential Fatty Acids in the Chick. I. Development of Fat Deficiency.* (22718)

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Symptoms of essential fatty acid deficiency in various animal species in which it has been produced are rather similar. Thus, in the rat(1), dog(2), guinea pig(3), and mouse (4), onset of deficiency is relatively slow and becomes apparent in changes in skin and fur as well as in decreased growth rate. The periods required for depletion of essential fatty

* Preliminary report appeared in *Poultry Sci.*, 1955, v34, 1231.