this virus in 1:20 only. On the other hand, human strains recently isolated fail to be neutralized in as low as 1 : 20 by the otherwise powerful serums. Convalescent serum from past epidemics neutralizes the new human strains in dilutions up to the neighborhood of 1 : 50. These relative values may be set down in tabular form. (See Table I.)

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Nutritive Properties of the Seed of the Tobacco Plant (Nicotiana tabacum) *

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Although every part of the tobacco plant has been reported to contain nicotine, this alkaloid could not be detected by Vickery and Pucher in the fully ripened seed of Connecticut shade-grown tobacco by chemical methods.[1] Ilyin,[2] who has studied the distribution of nicotine in the plant, found that immature seed, and particularly the ovules at an early stage of development, contained small proportions, but that, as ripening progressed, the alkaloid content diminished until finally none could be demonstrated. In view of the toxic properties of nicotine it seemed that a simple physiological test for its presence in tobacco seed would consist in feeding trials on small animals. We therefore offered to albino rats a ration that consisted either of ground tobacco seed 98%, Osborne-Mendel salt mixture[3] 2%, or ground tobacco seed 99%, sodium chloride 0.5%, calcium carbonate 0.5%; cod liver oil was administered as a supplement at the rate of 10 drops per day. The diet was consumed with avidity and without any evident untoward consequences; the animals grew at a satisfactory rate and appeared to be normal in every respect. This somewhat surprising outcome led to a detailed study of the nutritive properties of the tobacco seed.

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[1] Vickery, H. B., and Pucher, G. W., *Conn. Agri. Exp. Station*, 1930, Bull. 311, 234.

[2] Ilyin, G., *U. S. S. R. State Inst. for Tobacco Research*, 1929, Bull. 57.

[3] Osborne, T. B., and Mendel, L. B., *J. Biol. Chem.*, 1919, **37**, 572.

The seeds are very small, 100 of them weighing in the neighborhood of 0.009 gm., and yield approximately 43% of a pale yellow oil when extracted with anhydrous ether. The crude protein, calculated from the nitrogen content, amounts to approximately 20%. At least half the protein of the seed can be obtained as a crystalline globulin that resembles edestin from hemp seed in many respects.

Experiments designed to provide evidence of the presence of vitamin A in the seed were not entirely conclusive. It is certain that the seed does not contain a concentration of this vitamin adequate for successful growth, or for complete protection against xerophthalmia; it is probable, however, that the vitamin is not entirely absent.

Vitamins B and G were found to be present in tobacco seed in quantities sufficient to promote growth at a normal rate and to provide for general well-being. Under circumstances in which unusual demands for vitamins B and G are made by the organism as, for example, during lactation, a moderate degree of deficiency was apparent.

No final conclusion can yet be drawn with regard to vitamin D, but the available evidence indicates that tobacco seed is almost entirely deficient in this respect.

Vitamin E is present in tobacco seed in quantities adequate to provide for reproduction and to protect both sexes from physiological changes due to a deficiency of this factor. Out of many breeding trials, in which the animals of both sexes had been reared on the fundamental tobacco seed diet, one male animal only failed to prove potent; the females were invariably able to produce offspring. These experiments were extended, with considerable success, to the production of a third generation of animals on the same diet.

It is obvious that the total protein of tobacco seed is of good biological quality. Although no feeding experiments on the isolated globulin have yet been attempted there is every reason to suppose that it resembles, with respect to the presence of the amino acids essential in nutrition, the proteins of other oil seeds for which data have been obtained.