

performance as the criteria. These studies cannot be run in 30 days or even one year. It will require years before a synthetic product can be proved. The technologist says this will block progress. No, it will not block progress, it might save a large segment of the human race from much illness and unhappiness.

**Resume.** Anyone who will take the time to read the nine volumes of the history of the farm will find that the criticisms of the physicians of today who feel that milk is a food interfering with good human nutrition have been answered therein. The greater part of this answer is given in Erf's general discussion in the second half of Volume Two. Here he discusses the importance of the health of the cows with reference to the quality of milk given; the effect of incompletely digested food stuffs by the cow on the consumer; the effect of the destruction of the producer distributor; the effect of law and bureau on the quality of milk. He quotes the early work of Lyman and Kitchin on the study of the composition of the bones and teeth and why the teeth break down. Some of these were empirical observations and

today we tend to throw such observations overboard as being unscientific.

The dairy farmer, if he wants to survive, would do well to return to the precepts of Coit and Erf, and talk about **QUALITY MILK NOT JUST PRICE**. He must be able to show that his practices produce a product that will raise the finest of animals. That the anti-stiffness factor, the proper minerals, fats, proteins, enzymes, and antibodies are all present in the amount necessary to raise the finest of boys and girls. This requires cleanliness and devotion to the cause of health, not the eight hour day nor the dollar alone.

#### BIBLIOGRAPHY

1. William R. Keenan, Jr., History of Randleigh Farm, Vols. 1 to 9. Private printing, Lockport, N.Y.
2. Van Wagtendonk and R. Wulzen, Vitamins and Hormones, Vol. VIII, 1951. Academic Press, Inc., New York, N.Y.
3. Constitution of World Health Organization, p. 3, Chronicles of World Health Organization, 1:29-43, Geneva 1957.
4. Inadequate Diet and Nutrition Deficiencies in the U. S., Their Prevalence Significance. Bul. National Research Council. No. 109, p. 36, Nov. 1943.
5. Antioch College, Yellow Springs, June 28-29, 1958.

### FAT-SOLUBLE VITAMINS

#### ANTISTIFFNESS FACTOR

A critical review has been presented by Dasler (1).

*Chemical nature.*—Ross, van Wagtendonk & Wulzen (8) reported the preparation, from cane juice, of a compound with a tentative formula  $C_{23}H_{46}O$ , which alleviates the stiffness induced in guinea pigs on certain experimental diets. From the ultra violet spectrum they conclude that the substance is a sterol. Dasler (1) doubted the purity of the product.

Oleson, Van Donk, Bernstein, Dorfman & SubbaRow (6) had previously found ergostanyl acetate to be active, a finding which was confirmed by Petering, Stubberfield & Delor (7), although they had to use much higher doses. Dasler & Bauer (2) could not confirm the antistiffness activity of ergostanyl acetate, and Dasler (1) points to the great difficulties involved in the assay.

*Symptoms.*—Perhaps the most interesting recent development is the observation by Wulzen & Plympton (10, 11) that guinea pigs reared on stiffness-producing diets finally become deaf, as demonstrated by inability to react with ear flicking to suitable auditory stimuli. Krueger, Wulzen & Leveque (4) showed that the deafness is due to distortion and pathological

calcification of the auditory complex. Among these abnormalities were reduction and irregularity of the depression for the paraflocculus, reduction of the size of the internal acoustic meatus and of the facial canal, thickening of the wall of the bulla and of the cochlea, obliteration of the tympanic cavity, and elongation of the external acoustic meatus by a second or even a third white hard incomplete annulus around the meatus. The auditory ossicles were often deformed and sometimes embedded in a hard white amorphous papillated mass having the appearance of sugar candy concretions. A series of skulls of guinea pigs exhibiting these malformations were exhibited at the 18th International Physiological Congress in Copenhagen in 1950.

Harris & Wulzen (3) described the following anatomical changes in guinea pigs reared on the stiffness-inducing diet: a peculiar type of arteriosclerosis, necrosis, and calcification of the skeletal muscle and myocardium, deposition of calcium salts in the smooth muscle of the gastrointestinal tract, in kidneys and liver, development adjacent to bones and joints of abscesses that frequently become calcified. Hamsters reared on the same diet did not develop these symptoms.

Weimar & Wulzen (9) described blood changes belonging to the syndrome hypocythemic, normochromic, and normocytic or macrocytic anemia, reduction in number of red cells in circulating blood, increased sedimentation rate for erythrocytes, leucocytosis.

*Possible relation to human pathology.*—Lansbury, Smith, Wulzen & van Wagtendonk (5) state that experimental production of a collagen necrosis disease with calcinosis by means of a deficiency diet is of interest to the rheumatologist and suggests the possibility of a nutritional factor in the pathogenesis of some of the collagen diseases.

#### ANTISTIFFNESS FACTOR

1. Dasler, W., *Chicago Med. School Quart.*, **11**, 70-73 (1950)
2. Dasler, W., and Bauer, C. D., *Proc. Soc. Exptl. Biol. Med.*, **70**, 134-35 (1949)
3. Harris, P. N., and Wulzen, R., *Am. J. Path.*, **26**, 595-615 (1950)
4. Krueger, H., Wulzen, R., and Leveque, P., *Abstracts Communs. 18th Intern. Physiol. Congr.*, 316-17 (Copenhagen, 1950)
5. Lansbury, J., Smith, L. W., Wulzen, R., and Wagtendonk, W. J. van, *Ann. Rheumatic Diseases*, **9**, 97-108 (1950)
6. Oleson, J. J., Van Donk, E. C., Bernstein, S., Dorfman, L., and SubbaRow, Y., *J. Biol. Chem.*, **171**, 1-7 (1947)
7. Petering, H. G., Stubberfield, L., and Delor, R. A., *Arch. Biochem.*, **18**, 487-94 (1948)
8. Ross, L. E., Wagtendonk, W. J., van, and Wulzen, R., *Proc. Soc. Exptl., Biol., Med.*, **71**, 281-83 (1949)
9. Weimar, V., and Wulzen, R., *Federation Proc.*, **9**, 134 (1950)
10. Wulzen, R., and Plympton, A. B., *Proc. Soc. Exptl. Biol. Med.*, **72**, 172-74 (1949)
11. Wulzen, R., and Plympton, A. B., *Federation Proc.*, **8**, 173 (1949)

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