similar though less marked resistance has been shown by the altered type of liver cell to an anesthesia from chloroform lasting for 2 hours.

In such animals that have developed a cytological resistance to uranium and chloroform, the percentage concentration of phenoltetrachlorphthalein in the plasma is not as high as it is in those animals with the formation of a normal type of liver cell which has less resistance to a secondary intoxication by uranium or to the use of chloroform for its hepatoxic effect. The removal of the dye from the plasma is more readily effected by those animals with a resistant type of regenerated epithelium than it is by the animals with a normal type of nonresistant epithelium.

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Synthetic Diets for Herbivora.

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Synthetic diets for herbivora present two special problems, first, because these species are accustomed to diets containing large amounts of cellulose, and second, they are accustomed to high levels of inorganic elements that tend to keep the urine alkaline. The chief problem in selecting a suitable source of pure cellulose is one of physical composition. We attempted to maintain goats upon synthetic diets in which the cellulose portion was furnished by paper, but never succeeded in maintaining the animals upon such a ration. They usually refused the feed entirely after a period of 2 weeks. On the other hand, we have found both goats and rabbits eat regenerated cellulose as readily as the rats, discussed in our earlier report.[1] In devising suitable inorganic mixtures for herbivora we have adopted the plan of imitating the ash constituents of a diet of natural feedstuffs known to be satisfactory for goats and sheep. Such a mixture, however, is rich in the element, silicon. Although it has long been recognized that skin, hair and wool are relatively rich in silicon, we know little of the nutritional requirements for this element. Furthermore, we know little about the form in which it occurs in plants and almost nothing concerning its metabolism in the animal body.

[1] McCay, C. M., PROC. SOC. EXP. BIOL. AND MED., 1929, **27**, 209.

During the past year we have maintained an adult male goat upon a synthetic diet of the following composition, for a period of 152 days: regenerated cellulose* 30, corn starch 30, casein 15, sucrose 10, yeast 5, salt mixture 7, and lard 3. The salt mixture was made by mixing together the following salts and acids: K_2CO_3, 219.0, Na_2CO_3 1.9, $CaCO_3$ 192, $MgCO_3$ 96.6, Fe citrate 20.0, H_2SO_4 30, H_3PO_4 41.8, Na_2SiO_3 97.0, HCl 28.5, $CuSO_4$ 0.2, KI 0.03, $MnSO_4$ 0.12, NaF 0.37, K alum 0.037. This animal was allowed free access to NaCl. This goat was maintained in nitrogen balance and was quite fat when it suddenly died of a kidney infection at the end of this period. In a more recent experiment, 6 young kids were transferred directly after weaning to a synthetic diet of similar design, except the cellulose proportion was lowered and the salt mixture contained no added silicates and the cations were fed as citrates. These kids are still growing normally at this time after consuming this synthetic diet for 2 months.

Twenty rabbits have also been fed synthetic diets of similar composition. They consume the feed readily and young animals continue to grow for about one month. In the case of the rabbits, the optimum cellulose level seems to be about 30%. Mineral mixture at a 6% level seems sufficient. Silicon does not seem essential.

Upon these purified diets young rabbits cease to grow and start losing weight in about one month. At the end of about 6 weeks these young animals develop a paralysis of the rear legs, in spite of the fact that this diet is nutritionally complete for rats. The histological picture of the degenerated muscles found in the paralyzed legs is similar to that described by Goettsch and Pappenheimer.[2] This paralysis is not due to a deficiency in the recognized B factors since it is not cured by large doses of yeast or Harris concentrate. Adult rabbits develop a similar paralysis after about 80 days. This paralysis develops upon a diet in which the protein is furnished by egg albumin as quickly as it does with casein.

In a single preliminary experiment using 7 litter mates, 5 of the young died with the paralysis while the 2 remaining were changed to a diet of alfalfa as soon as they started to lose weight. They recovered, made a normal growth and showed no muscle degeneration after being killed.

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* Furnished as washed "Sylphrap" by the Sylvania Industrial Corp., 122 East 42nd Street, New York City.

[2] Goettsch, M., and Pappenheimer, A. M., *J. Exp. Med.*, 1931, **54**, 145.