However, it was found that if there were 7 to 9 hours elapsing between time of death and time of culturing there would be an increase in the frequency of the occurrence of anaerobic organisms within the tissues. The organism that predominated was a large gram positive spore-forming rod which resembles *Bacillus sporogenes* in many of its cultural characteristics. Yeasts and molds were absent from the cultures, except from lungs and bronchi. From this source, the green mold was commonly present.

No attempt will be made at this time to offer an interpretation of the results presented above. The work is being continued and it is our hope that after a larger number of necropsies have been investigated, we may be able to draw some significant conclusions.

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The Effect of Roughage Upon Growth.

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The diets shown in Chart 1 were designed for the purpose of determining the influence of large quantities of "roughage" upon the rate of growth. Ration 1 contains 10% cellulose while numbers 2 and 3 contain 20%. Diet 4 contains 20% of agar-agar. Nos. 1 and 2 contain moderate amounts of fat while numbers 3 and 4 have 45% of their total weight in the form of lard and cod liver oil. All rations were designed to contain adequate amounts of protein, fats, carbohydrates, mineral matter and vitamin supplements. The levels for protein and mineral matter were increased for rations 3 and 4 in accordance with the procedure of Smith and Carey.[1] The salt mixture employed was that of Osborne and Mendel. Cellophane was selected as a source of cellulose since it represents a very pure form. In addition to the mixed diet all animals were fed separately a daily allowance of 200 mg. of vitavose and 3 drops of cod liver oil.

Ten male rats were reared from the time of weaning upon rations 1 and 2. These showed a marked decreased rate of growth when compared with a control group whose growth rate is shown by curve C while representative rates for the other groups are shown by typical curves properly numbered. The control ration was iden-

[1] Smith, A. H., and Carey, E., *J. Biol. Chem.*, 1923, lviii, 425.

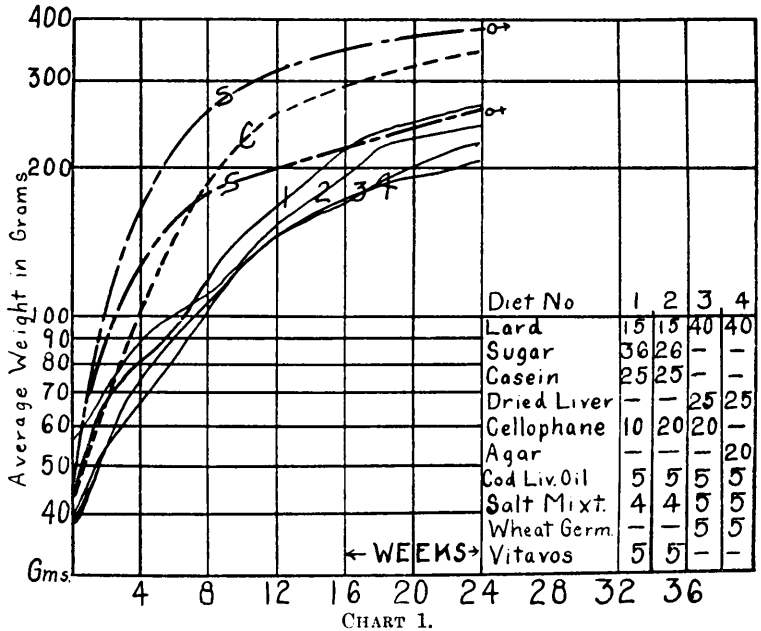

CHART 1.

Growth curves of rats reared upon high roughage diets. Semi logarithmic scale diagram.

tical with number 1 except that the cellulose was replaced by the same per cent of sucrose. Curves S are those for males and females reared upon our stock ration. These are described elsewhere by Maynard.[2] Since we obtained subnormal growth with rations 1 and 2 containing 10 and 20% cellulose we felt that this might be due to the inability of the rat to consume sufficient calories. The high calorie diets Nos. 3 and 4 were designed for subsequent experiments. Five male and 5 female rats were reared upon each of the high fat rations. Both sexes showed identical growth rates. Hence, the females were much less affected than the males. We must conclude that growth of rats remains subnormal upon high roughage diets independent of whether the diet contains a moderate or a large amount of fat.

No evidence of physical injury by diets containing large amounts of roughage has been obtained. With 3 exceptions all rats reared upon these rations have attained maturity and except for being slightly smaller cannot be distinguished from our best stock animals. All animals were kept for more than 10 months with no other diet than these respective rations. Those upon rations 1 and 2 were

[2] Maynard, L. A., *Science*, in press.

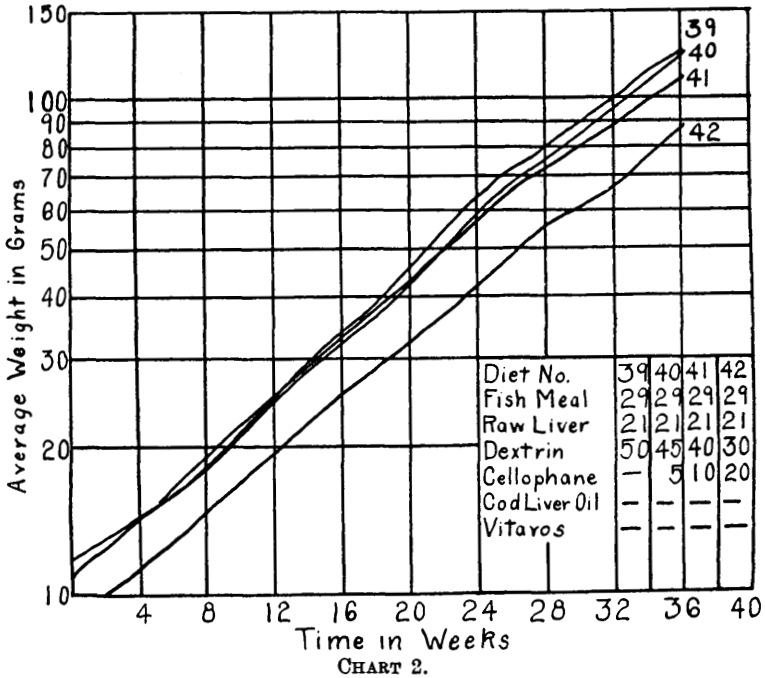

CHART 2.

Growth curves of brook trout reared upon diets with varying amounts of cellulose. Semi logarithmic scale diagram.

kept upon the diets for more than 13 months. Little difference was noted between those fed cellulose and those fed agar-agar.

In Chart 2 we have shown representative growth curves for brook trout reared upon rations containing 5, 10 and 20% of cellulose in rations 40, 41 and 42 respectively in comparison with diet 39 which contains none. Thirty trout were fed each of the experimental rations. The growth curves represent the rates for the average individuals of each group. The growth curves are logarithmic and show rates which are comparable with the best we have obtained under any dietary conditions. The same technique of feeding and weighing was employed as that described previously.[3] From these data one must conclude that trout in spite of their very short intestinal tract can tolerate very large amounts of roughage in their rations without any influence upon their rate of growth.

[3] Titcomb, J. W., *et al.*, *Trans. Am. Fisheries Soc.*, 1928, lviii, 205.