tion and the utilization of food. The addition of yeast to diets partially inadequate in the vitamin B complex increases the food intake of the rats but primarily increases the degree of utilization of the food ingested. The addition of liver to an adequate diet has little effect on the degree of utilization of the food but greatly increases the food intake. The effect of yeast and of liver on the consumption of food was demonstrated in experiments in which the diets were fed *ad libitum*. The effect of liver and of yeast on the utilization of food was demonstrated in experiments in which the food intake was restricted so that the rats received equal quantities of food of equivalent calorific value. The results of these experiments are shown in Table I. The extraordinary effect of the liver on the rate of growth of rats may be attributed to the increased food intake resulting from stimulation of the appetite. It is noteworthy that this stimulation of appetite was most evident during the first half of the 40 day period and was hardly apparent during the last half. This investigation of the relation of the appetite to food intake, food utilization, and growth is being continued.

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Pathogenic Properties of Organisms Obtained From Joints in Chronic Arthritis.

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During recent years considerable evidence has been brought forward to show that chronic arthritis is due to streptococci. Forkner, Shands and Paston[1] obtained *Streptococcus viridans* from the joints in 11 of 63 cases; Cecil, Nicholls, and Stainsby[2] obtained cultures of atypical streptococci from the blood in 49 of 78 cases.

I wish to report the results of cultures from the joints of 50 cases. In most instances the cultures were made from material obtained by aspiration of the joints and periarticular tissues. From 10 to 20 cultures were made from each joint and several varieties of culture media were used. The media which proved most successful were Rosenow's glucose brain broth and hormone medium, made from beef heart.

[1] Forkner, Shands and Poston, *Arch. Int. Med.*, 1928, xlii, 675.

[2] Cecil, Nicholls and Stainsby, *Arch. Int. Med.*, 1929, xliii, 571.

Eighty-eight aspirations were performed on 50 cases. Of these 39 were chronic atrophic arthritis, 6 were chronic hypertrophic arthritis, and 5 were periarthritis of the shoulder. In addition to the aspirations, biopsies were performed 9 times in 7 cases and cultures were made from small bits of synovial membrane and cartilage. Positive cultures were obtained in 20 of 39 cases (51%) of atrophic arthritis, in 3 of 6 cases (50%) of hypertrophic, and in 2 of 5 cases (40%) of periarthritis of the shoulder. The organisms obtained were staphylococcus, 15 times, minute bacilli in masses, 4 times, mixed cultures of the above organisms, 10 times. In 2 of the mixed cultures short chained non-hemolytic streptococci were associated with either diptheroids or staphylococci. There was no tendency for any one organism to be associated with either the atrophic or hypertrophic form of the disease.

The organisms were as a rule slow growing in the original cultures, and in some cases did not appear until 3 weeks after the inoculation. They did not grow in ordinary media and there was considerable difference in the amount of growth in the media used; while some of them died out within a few weeks. The cocci were uniformly gram positive, while the minute bacilli or diptheroids, were gram negative, but often contained polar bodies which were feebly gram positive. The pathogenic properties of the organisms were tested by injecting them into the knee joints of a series of rabbits 77 rabbits were injected with organisms obtained from 15 cases, and in each instance both knee joints were used, making a total of 154 experimental joints. In one of these rabbits were pyogenic joints produced. 40 of the joints were negative. In the remaining 114 there was a variable degree of chronic arthritis. These have been classified as +, ++, +++, and ++++, varying from slight excess of clear fluid with a small amount of synovial hyperplasia, to joints which were markedly distended with cloudy fluid and in which there was some periarticular thickening and marked hyperplasia of the synovial membrane; or joints in which there was relatively little excess fluid, but in which there was marked degeneration of the cartilage with considerable synovial proliferation and, in some cases, overgrowth of bone cartilage. The gross and microscopic changes in the joints and the cytology of the exudates were similar to those present in the chronic arthritic joints of humans; but there was no tendency for the disease to involve joints which had not been injected, and in none of these rabbits was the typical polyarthritis produced, although some of them were kept over a year.

When the animals were sacrificed small bits of the synovial membrane were planted in culture media. Of 90 joints, thus cultured, 25 were positive and 65 were negative. Nine of the positive cultures were contaminations, and in the remaining 16, organisms apparently identical with those injected were obtained.

We have thus produced the lesions characteristic of chronic arthritis in a series of rabbits by injecting organisms obtained from the joints of patients with the disease, and in a certain number of cases we have grown the organisms from the joints of the rabbits. We have injected these organisms into the circulation of rabbits with negative results. The staphylococci produced chronic arthritis in 66 of 84 instances (78%) and minute bacilli produced chronic arthritis in 34 of 50 instances (66%).

These results are open to 3 interpretations. (1) We are dealing with contaminations which are capable of producing chronic low grade arthritis, in animals. (2) We are dealing with non-specific organisms which are present in the tissues of patients with chronic arthritis, but which have no causative relationship to the disease. (3) Chronic arthritis is an infectious disease which may be due to any one of several organisms and is most often due to a low grade staphylococcus. It is probable that there is some as yet unknown abnormal susceptibility in those individuals who develop the disease.

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Oxidation of Lactic Acid by Dog Erythrocytes.

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The blood of certain species converts glucose to lactic acid but lacks the power of oxidizing either, and of oxygen consumption. The observation by Fürth and Lieben[1] of lactic acid destruction by horse erythrocytes was not confirmed by Warkany;[2] while Koechig[3] in this laboratory using the method described by Ray[4] failed to detect loss of lactate or formation of acetaldehyde. It appears that

[1] Fürth and Lieben, *Biochem. Z.*, 1922, cxxviii, 144.

[2] Warkany, *Biochem. Z.*, 1927, clxxxiv, 480.

[3] Koechig, unpublished results.

[4] Ray, *Am. J. Physiol.*, 1927, lxxxii, 405.