the upstroke to the dicrotic notch. The subjects were 20 normal men, and 1,600 cycles were measured. A curve in which the average duration of systole and of diastole were plotted in relation to pulse gave a striking picture of the shortening of systole and diastole by increasing heart rate.

The great variation in the length of systole and diastole which may occur within a single minute was emphasized. Both are affected by respiration, and diastole, at least, by vaso-motor influences.

It can now be definitely stated that the changes in the length of the systole and the diastole observed in succeeding cycles have no constant relation to each other, and therefore are probably brought about in different ways.

The special object of this communication is to attract attention to the great difference in the average length of systoles and diastoles caused by a change in the position of the human body. It has been found that, in sitting the systoles average by pulse rates from 50–95.9 per cent. longer than in standing, and in lying down 17 per cent. longer than in standing. The diastoles are also lengthened, but only to about one half as much as the systoles.

The change in the length of the systoles caused by change of position of body, although of course influenced markedly by the pulse rate, is not due to the pulse rate alone, for the systole may be lengthened when the pulse rate has undergone no change, or when it is changed, the percentage change in systole may be much greater than that of the pulse rate.

58 (1433)

The extraction of "fat-soluble vitamine" from green foods.

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We have recently published experimental data to demonstrate the occurrence of "fat-soluble vitamine" in certain foods.[1] McCollum, Simmonds and Pitz[2] have stated that "ether extraction

[1] Osborne and Mendel, *J. Biol. Chem.*, 1919, XXXVII, 187.

[2] McCollum, Simmonds and Pitz, *Am. J. Physiol.*, 1916, XLI, 363.

of plant tissues does not remove the substances essential for growth which is contained in butter fat." They further say "owing to the large content of waxes, etc., extracted from plant leaves we have not been very successful in feeding ether extract from these sources." We have, however, obtained potent preparations as follows: Spinach leaves and young clover respectively, dried in a current of air at about 60°, were extracted with U. S. P. ether. The resultant green extract, yielding an oily residue equal to about 3 per cent. of the dried plant, was evaporated. upon starch. These preparations, fed in daily quantities equivalent to 1–2 grams of the dried plant, promoted recovery and renewal of growth in rats declining in weight on diets deficient in fat-soluble vitamine. Inasmuch as only 30 milligrams per day of the ether extract of spinach sufficed for this purpose it appears that this product ranks among the most potent of the oils heretofore tested.

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59 (1434)

Arsenic penetration of the meninges during the treatment of neurosyphilis.

By **H. G. MEHRTENS** and **C. G. MCARTHUR** (by invitation).

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It is difficult to estimate from clinical results the relative values of the different methods of treating neuro-syphilis. The amount of arsenic that reaches the cerebrospinal fluid may, however, be estimated quantitatively with reasonable accuracy, and the effectiveness of the treatment may be assumed to parallel this amount of penetration.

Quantitative estimations of arsenic penetrating the meninges was made in about 100 spinal fluids. These were divided into the following groups:

Group A—44 cases in which spinal drainage was performed one hour after simple intravenous injection of 0.6 arsphenamine.