quantities equivalent to 60 calories/kg. per day. This constituted the only food for the first 12 weeks. In the last 6 weeks of the experiment 50 gm. of oats were given to each animal once a week. After 18 weeks of cabbage feeding, the animals were killed, and the thyroid glands were weighed.

The results (Table I) indicate that the prolonged feeding of cabbage which is originally not goitrogenic, and is irradiated in the manner described does not produce thyroid enlargement. Non-goitrogenic cabbage, therefore, does not seem to contain the precursors of a goitrogenic substance that can be synthesized by prolonged irradiation under the conditions stated for this experiment.

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Vestibular Function in Experimental Beriberi.

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The neuromuscular manifestations of beriberi (vitamin B_1 deficiency), the so-called "convulsions, spasticity and paralysis", simulate in some respects the disturbances of equilibrium and coordination which follow injury to the labyrinths. It has been suggested that these manifestations are the consequence of a lesion of the vestibular apparatus, but histological examination has failed to substantiate this hypothesis.[1] The investigation here reported was therefore devoted to a functional examination of the vestibular system to gain further information regarding the existence of such a lesion.

Vestibular function was tested by a modification of the well known Barany test. The character and duration of nystagmus following a standardized rotational stimulus served as the index. More than 2,000 tests have been made on 84 rats under various experimental conditions. The basal diet used throughout these experiments, when supplemented with codliver oil and brewer's yeast, permitted normal growth and health. When the whole yeast in the supplement was replaced by autoclaved yeast, however, the neuromuscular manifestations of beriberi appeared in 5 to 7 weeks.

[1] Woollard, H. H., *Australian J. Exp. Biol. and Med. Sci.*, 1932, **9**, 173.

The standard rotational stimulus was given by means of an electric phonograph motor and turntable upon which the animal was placed with its head held in the normal resting position at the center of the rotating disk. A speed of 2 revolutions per second was employed and this speed was attained in approximately 8 seconds. At the end of 20 seconds' rotation the electromagnetic brake was applied, bringing the turntable to a stop in 3 to 4 seconds. With the aid of a metronome the seconds were counted off from the moment the brake was applied until the pendular movements of the eyes induced by rotation had ceased. The animal was completely covered during rotation. A definite relation between speed of rotation and duration of nystagmus has been worked out. The time of rotation was such as to produce the maximal response in normal animals. The vestibular test consisted of clockwise rotation and observation of the duration of nystagmus followed immediately by counterclockwise rotation and observation. If the results did not agree within 3 seconds the observations were repeated and averaged with the first. The vestibular tests were performed on beriberi and control animals of the same litter in immediate sequence and were repeated several times a week. Many of the beriberi animals were treated after the appearance of neuromuscular symptoms and the tests were continued during recovery. Some received a single dose of antineuritic vitamin sufficient to allay the acute symptoms and were followed to subsequent recurrence.

The results are as follows: 1. The duration of nystagmus induced by a standard rotational stimulus in young normal rats varies but slightly from day to day. It diminishes somewhat with repetition and with approach to maturity. These results are in agreement with the work of Detlefsen.[2] 2. The duration of nystagmus in beriberi rats after a 4 week depletion period is consistently greater than in the controls, increasing as the animal becomes more deficient, with a rapid rise to the maximum (which may be 2 to 3 times the normal) 2 or 3 days before the appearance of the usual neuromuscular symptoms. 3. During the acute stage of beriberi the nystagmus following rotation may be (a) prolonged as in 2 above, (b) atypical in character (*e. g.,* rapid nystagmoid oscillations gradually dying away), or (c) entirely absent. Spontaneous nystagmus is sometimes seen. Although complete loss of nystagmus does not always occur during the first acute attack it is usually associated with recurrence of the neuromuscular symptoms in protracted deficiency.

[2] Detlefsen, J. A., *Proc. Am. Phil. Soc.,* 1923, **62**, 292.

4. The vestibular response of the beriberi rat shows a rapid change toward normal following treatment with brewer's yeast or heat-labile fraction. After complete loss of nystagmus the characteristic response appears as early as 4 hours following treatment, although it is still prolonged. When treatment is continued daily the duration of the response drops to normal limits within a week. 5. The increased duration of the vestibular response, together with certain qualitative changes, appears to be characteristic of deficiency of the heat-labile fraction of vitamin B. All other factors so far investigated, including partial and complete starvation, middle and inner ear infections ("mastoid disease" of Detlefsen[2]), vitamin A deficiency, and vitamin G deficiency, either diminish the duration of the response or are without effect. 6. These results indicate an early involvement in beriberi of the vestibular system or of the nerve pathways serving vestibular nystagmus.

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An Easily Inserted Flexible Cannula.

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In the development of a technique for constant intravenous injection a cannula was devised which is easily manipulated and which has proved useful for the injection and removal of fluids over extended periods of time. It is introduced into a vein through a needle, after the manner of a trocar and cannula, and, when in place, provides a flexible, elastic, and resilient channel for the passage of liquid. It has been found satisfactory not only for intravenous work but also—by Dr. Henry N. Harkins of our Department of Surgery—for experimentation with cerebrospinal fluid through cisterna puncture. No doubt it will prove to be a useful instrument for the cannulation of many of the spaces in the body.

The cannula is made of high grade anode rubber in the form of a capillary tube. Although there is no theoretical limit to the size of a cannula which may be used in this manner, one with an outside diameter of 0.04 inch has been found satisfactory. The cannula is inserted in the following way. First, the cannula is "threaded" in a syringe partly filled with injectable liquid (Fig. 1). A knot should