(Nos. 1, 3, Table II) some indication of a depression of the rise with anesthesia. The other 3 showed no consistent difference between tests with and without anesthesia. Anesthesia has no definite effect on the variability of response in the dog.

For most routine testing, the anesthetized dog is the preferable test animal. If a sufficient time interval is allowed between tests, the repeated use of 2 or 3 dogs affords as accurate an assay as one based on 1 test each on a large series of dogs. Assays in both anesthetized and unanesthetized animals will show large variation, and a minimum of 10 tests is required for accuracy. Where the rise expected is clearly sub-maximal, the more rapid assay on unanesthetized dogs can be substituted.

Summary. The magnitude of the blood pressure rises given by large doses of renin must be corrected for differences in starting pressure levels, while those given by smaller doses need not be. An assay based on repeated tests on 2 or 3 dogs is as reliable as one based on a larger series of animals. Nembutal anesthesia may affect, in some dogs, the magnitude of the rise after large renin doses, but usually has little effect on the rise after small doses. For most routine testing, the anesthetized dog is the preferable test animal.

11721

Labyrinthine Disregard after Removal of the Caudate.*

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In an earlier research upon neostriatal function[1] the present authors observed that "It is difficult to escape the suspicion that animals (cats) with neostriatal injuries suffer from some variety of vestibular disturbance"; the literature relating to this observation was reviewed and it was noticed that Bergouignan and Verger[2] found that the ipsilateral circus movement (dogs) produced by unilateral caudate lesion was accentuated by rotation to the same side while rotation to the opposite side gave no circus movement. Cocainization of the labyrinth of either side always produced an accentuation of

* Financial assistance from the Milbank Memorial Fund is gratefully acknowledged.

1 Mettler, Fred A., and Mettler, Cecilia C., *Role of the Neostriatum,* in press.

2 Bergouignan, M., and Verger, P., *Compt. rend. soc. de Biol.,* 1935, **118**, 1539.

the original circus movement, never one toward the opposite side.[2] In the further work of Bergouignan and Verger there is, so far as we are aware, no conclusive evidence to indicate whether these results are due to disregard of the labyrinth of the same side or over-emphasis of labyrinthine stimuli from the opposite side.[3] In order to arrive at some information on this point a series of animals were prepared in which (1) both frontal regions exclusive of the caudate nuclei were removed; (2) both frontal regions inclusive of the heads of the caudate nuclei were ablated, and (3) complete, bilateral, labyrinthine destruction had been carried out.

Rotation of animals of the first or second group produced effects of the same type as those seen in normal animals though there was less obvious distress exhibited by either type of operated animal during rotation than was displayed by normal cats. Further, although no part of the usual post-rotation symptomatology was absent or perverted, this did not persist so long in the operated as unoperated animals. These differences cannot be explained upon the basis of postoperative weakness, for the operated cats were in good health and had attained a stable state. Between the first and second group there were similar quantitative differences. No evidence of subjective discomfort whatever was exhibited by Group 2 during rotation (such as mewing) and, after rotation, the forced movements, postures and nystagmus subsided more promptly than in Group 1.

Following labyrinthine destruction, animals of the third group exhibited a crouching posture and dyskinesia especially in the form of ataxia accompanied by coarse tremors (more particularly when eating). Removal of the heads of both caudate nuclei, some weeks later, completely abolished these phenomena and except for the fact that such animals showed no post-rotatory effects they were quite indistinguishable from others, lacking only the caudate nuclei. This change from hesitating dyskinesia and a crouching, hypokinetic posture to full hyperkinetic, synergic locomotion, carried out with slightly increased extensor hypertonia and oversteppage was immediate.

The fact that the typical pattern associated with caudate damage ("leaping", hyperkinesia, resistance to impressed movements, etc.) immediately displaces the evidences of labyrinthine destruction demonstrates not only that these require the presence of either the frontal cortex or caudate or, as is more probable, both for their manifestation but also that all the phenomena of caudate injury

[3] An article listed as Delmas-Marsalet, P., Bergouignan, M., and Verger, P., *Rev. de laryng.*, 1937, **58**, 353, has been inaccessible to us.

may appear in the absence of the labyrinth and are thus not necessarily dependent upon labyrinthine stimulation.

It is concluded (1) that, following removal of the heads of both caudate nuclei, labyrinthine stimulation exercises a reduced influence of a normal type upon the behavior of the animal and that (2) such removal abolishes the dyskinesia and hypokinesia, which follow destruction of both labyrinths, substituting in their place the typical effects which follow the former operation (namely "leaping," hyperkinesia, resistance to impressed movements and a certain degree of fatuity).

11722

Rate of Absorption of Amino Acids from the Small Intestine in Man.

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Using the Miller-Abbott[1] tube for intestinal intubation, observations were made on the disappearance rate of nitrogen from an amino acid mixture placed directly into the jejunum. Solutions of known concentration were introduced immediately above a single inflated bag at a point 50 to 80 cm below the pylorus, a method used by Groen[2] in studies on glucose absorption. Fasting jejunal juice was obtained before each series of observations and the figure found for nitrogen in each instance (0.6-1.2 mg cc) was subtracted from the results of analyses made on specimens withdrawn at intervals subsequent to the introduction of the solutions.

The subjects included 2 normal individuals, 2 with duodenal ulcer responding well to medical management, 3 with achlorhydria (well-controlled pernicious anemia patients), and one patient with a subtotal gastric resection. Repeated observations were possible with several subjects. As a control, the rate of absorption of unhydrolyzed protein was determined at least once for each of the 4 classifications mentioned above.

The amino acid mixture* used was "a purified casein digest pre-

[1] Miller, T. G., and Abbott, W. O., *Am. J. M. Sci.*, 1934, **187**, 595.

[2] Groen, J., *New England J. M.*, 1938, **218**, 247.

* Product 92Z, Mead Johnson & Co.