

# SCIENTIFIC PROCEEDINGS.

## ABSTRACTS OF COMMUNICATIONS.

### Sixtieth meeting.

*Carnegie Laboratory for Experimental Evolution, Cold Spring Harbor,  
June 6, 1914. President Lusk in the chair.*

98 (915)

**Extra sugar during ether and nitrous oxide narcosis in fully  
phlorhizinized dogs. Sources of error in existing methods  
for the study of gluconeogenesis.**

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Dogs were prepared by injecting subcutaneously 1 gram of phlorhizin suspended in olive oil once every twelve hours until the G : N ratio was constant, then every 24 hours.

It has been observed by Lusk<sup>1</sup> that fasting and phlorhizin alone do not remove all glycogen from the body. This was confirmed for dogs prepared in the manner described. Such animals were narcotized with ether, nitrous oxide and other narcotics. Narcosis with ether and nitrous oxide was always followed by a large increase of the glycosuria with a rise in the G : N ratio. When ether and chloroform were used, there was as a rule, a fall in the output of nitrogen and acetone bodies and a fall in sugar following the initial rise, but with nitrous oxide the rise in sugar was unaccompanied by such changes. In one of the ether experiments also the fall in nitrogen was very slight and there was no lessening of the glycosuria following the initial increase.

An animal prepared in the usual way was given a cold bath for 20 minutes followed by 6 hours of moderate shivering. After this 1 mg. of epinephrine was given intravenously once every 6 hours.

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<sup>1</sup> *Ergeb. der Physiol.*, XIII, p. 361 (1912).

At first there was a marked increase in the glycosuria, but ultimately the G : N ratio resumed the normal level and was little affected by epinephrine. Nitrous oxide narcosis was then induced as before. The extra sugar for 24 hours was now 1.8 g. as compared with a minimum of 7 g. in two previous experiments.

It is concluded that the "extra" sugar which is eliminated when phlorhizinized dogs are narcotized with ether and nitrous oxide has its origin in glycogen; that the increase in glycosuria incidental to narcosis is a phenomenon which can occur independently of any fall in nitrogen or decrease of the acetone body output. The lessened nitrogen and acetone excretions and the late fall in sugar following ether or chloroform administration suggest renal injury with general retention; or, possibly, they are due in part to suppression of the total metabolism. In any case they depend upon some action of the narcotic separate in kind or in degree from that which is responsible for the appearance of extra sugar. It is thought that asphyxia alone will produce results comparable to those seen with nitrous oxide.

The question arises as to whether acetaldehyde, pyruvic acid and some of the other substances which have been reported to increase the glycosuria in diabetic dogs prepared by the methods used in these experiments, may not do so by causing a mobilization of glycogen in a manner similar to that which follows the administration of the better known narcotics (general asphyxia or impairment of tissue respiration?). In the study of gluconeogenesis in diabetic dogs—especially when the substances administered are chemically active or possessed of pharmacodynamic properties, which is the case with short chain aldehydes, ketones, keto acids, etc.—the appearance of extra sugar in the urine affords no proof that the substance itself has been converted into glucose or that any *new* sugar has been formed from any other source (such as fat), unless suitable methods have been employed to eliminate the glycogen. If during the fore period preceding the experiment period a dose of epinephrine were given without causing the appearance of extra sugar, this would make it reasonably certain that a subsequent rise in sugar was not referable to an hydrolysis of glycogen. This is suggested as a convenient method of checking the effectiveness of the preliminary

regime. The criticism which may be made of experiments with short chain aldehydes, ketones, ketoacids, etc., in dogs prepared by fasting and phlorhizin alone are not applicable to the results obtained with animals which have been subjected to cold until all glycogen has been exhausted; nor is it necessarily implied that alanine, aspartic acid, lactates, propionates, and many other bland substances which have been studied might not yield entirely satisfactory results even in the presence of a residue of glycogen.

99 (916)

**On the difference in the response of animals of different ages to a constant quantity of uranium nitrate.<sup>1</sup>**

By WM. DEB. MACNIDER.

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The following report is based upon the difference in the response of forty-eight animals of different ages to a constant quantity of uranium nitrate.

Dogs have been employed in all of the experiments. The animals have varied in age from puppies of four months old, to animals of extreme old age, one of the animals having reached the age of twenty years.

All of the animals have received uranium nitrate in the dose of 6.7 mgs. per kilogram on two successive days. The uranium was given subcutaneously.

The animals were fed on raw meat and bread.

In a recent publication<sup>2</sup> it has been shown that when a constant quantity of uranium nitrate is given to young and full grown animals, that the age of the animal influences the total output of urine and also the composition of the urine. The total output of urine in a twenty-four hour period was greater in the adult animals. The percentage of glucose in the urine (Benedict determination) was greater in the adult animals than in the puppies.

In the urine of the puppies acetone was either absent or present

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<sup>1</sup> Aided by a grant from the fund for Scientific Research of the American Medical Association.

<sup>2</sup> MacNider, *Jour. of Pharm. and Exper. Ther.*, IV, 6, 1913.