16–26 days by feeding a mixture consisting of whole soy bean flour, milk, yeast, paper pulp, and inorganic salts,[1] have not been encountered during a period of 75 days in which 10 gm. of *raw* tomatoes were added daily to the diet. If on the appearance of the clinical scorbutic manifestations attributable to the scurvy-producing diet, 10 gm. of raw tomatoes are added as a daily supplement, the symptoms will subside and the animals will be restored to health.

Tomatoes *dried* in a blast of air either for 14–24 hours at 55–60° C. or for 36–44 hours at 35–40° C. retain some of their anti-scorbutic property. This statement is based on the fact that young guinea pigs receiving a daily addition of 1 gm. of either of such dried products have grown and continued in apparently perfect health for a period three times as long as that within which the usual scorbutic symptoms appear.

Further experiments are being conducted upon this subject.

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A method of producing experimental shock.

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In the numerous investigations on experimental shock there is no uniformity as to the method of inducing it. Some authors simply say "the animal was reduced to shock," without stating by what method it was induced or how long it took to induce it. Others claim that they have produced profound shock by continuous stimulation of sensory nerves, while other writers are quite positive that it is impossible to induce shock by this method. The method *par excellence* of producing shock seems to be the exposure of the abdominal viscera. Here again opinions differ. For instance, Erlanger and his coworkers say that in order to reduce blood pressure to 50 mm. mercury, an exposure and *manipu-*

[1] B. Cohen, PROC. SOC. EXP. BIOL. AND MED., 1918, XV, 102; M. H. Givens and B. Cohen, ibid., 1918, XV, 126; Cohen, B., and Mendel, L. B., *J. Biol. Chem.*, 1918, XXV, 425; M. H. Givens and B. Cohen, *J. Biol. Chem.*, 1918, XXXVI, 127.

lation of the intestines lasting from two to five hours is necessary. In the studies of shock by Githens and Meltzer "the intestines and stomach were dislocated and *frequently handled.*" Wiggers on the other hand states that a more regular and certain circulatory failure is induced *when the intestinal loops are not manipulated.* Many investigators kept the animals under surgical anesthesia throughout the experiment or at least during the greatest part of it.

Generally the fall of blood pressure is the sole criterion of shock. In the studies of Githens and Meltzer the fall of blood pressure and also the disappearance of pain sense were taken as criteria. They studied these phenomena an hour or more after the discontinuation of ether. Of forty-two dogs, in fifteen the blood pressure did not reach a level below 95 mm. within five hours after opening the abdomen, and pain sense returned as soon as the animals came out of ether. In only thirteen dogs the blood pressure reached a level below 70 mm. within two and a half hours and there was no return of pain sense. In these thirteen dogs the original blood pressure was not high. In eight dogs the blood pressure sank to a lower level, but sensation of pain returned when ether was discontinued. In six dogs sensation was lost while blood pressure was still above 95 mm. of mercury.

In experiments undertaken to throw light upon a certain problem in shock, we came across a method which seems to be effective in producing shock in every case and fairly early. The signs of shock were obtained with this method without exception in an unbroken series of experiments on seven dogs and nine cats. The method consists in repeated, strong compression with thumb and finger of the small gut, care being taken to avoid traction upon the mesentery. In all the animals the original blood pressure was fairly high. The strongest effect was a fall of blood pressure from 145 to 45 mm. within one hour and four minutes (cat). In all the animals a considerable fall of blood pressure was obtained within about an hour and fifteen minutes. It seemed that when the compression was produced during deep etherization, the fall began early and was more profound and of longer duration. Whether or not etherization had been deep, loss of pain sense was noted early. In most instances the blood pressure rises moder-

ately again when the animal is left for some time without ether and without squeezing of the gut. In one dog with original blood pressure of 160, the blood pressure which fell to 68 mm. rose after three hours to 120 mm. It is different, however, with the sensory shock. In not a single instance did the pain sense return at any time. This holds good even for cases in which the lid reflex was prompt.

The subject will require a great deal of detailed study. But we thought of putting our experiments on record on account of the value it may have for experimental shock and especially on account of its possible practical importance in human surgery. In abdominal surgery no care is taken to avoid compressing of the gut; on the contrary, it is often employed to achieve a definite end. On the other hand, traction on the mesentery is carefully avoided. In our experience traction on the mesentery rather favors some rise of blood pressure.

4 (1379)

Metabolism of p-hydroxybenzoic acid and p-hydroxyphenylacetic acid in the monkey.

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p-hydroxy benzoic acid was fed to a monkey in one, two and three gram doses, the urine was collected for 36 hours following each dose, evaporated and extracted. The urine was found in every case to contain only the uncombined acid. This agrees with the findings of other investigators who have fed this acid to several of the lower animals. In each case from 50–60 per cent. of the acid was recovered from the urine.

After feeding *p*-hydroxyphenylacetic acid in one or two gram doses, approximately 60 per cent. of this acid was recovered from the urine of the monkey. Some of this acid existed in the free state, while a portion of it was excreted in the urine in combination with glycocoll as *p*-hydroxyphenaceturic acid. *p*-hydroxy-