The xanthin diuretics were also tested for their possible anticonvulsive action, but were found not to show any such action. Their diuretic effect would, therefore, seem to be of renal origin exclusively. Other heavy metal compounds, however, are likewise anticonvulsive, hence "tissue-diuretic". Detailed data are to be given later.

Conclusion. Mercurial diuretics have a potent anticonvulsive effect. Study of the details of this effect leads to the conclusion that these diuretics increase membrane impermeability, dehydrate tissue and thus work as "tissue diuretics," notwithstanding their well known renal action.

11376 P

Serum Albumin Changes in Hypoproteinemic Dogs Following Administration of Methionine or Phenylalanine.

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The observation by Whipple and his coworkers that single amino acids and pure chemical substances increase the production of hemoglobin[1] and serum protein[2] raises the question of whether observed increases in serum protein after protein feeding are not solely the result of chemical stimulation, or mobilization from body stores of protein, as distinguished from a new synthesis from the ingested protein materials. If so, recorded differences in proteins (when concluded from changes in serum protein levels) would be merely an expression of a difference in amino acid composition and not necessarily express the nutritive value of the proteins for growth or maintenance.

Before such an interpretation can be made, it is essential to have additional data; and especially to determine whether single amino acids under conditions of low dietary protein, as in the procedure of Weech and Goettsch[3] will effect an increase in serum protein.

[1] Robscheit-Robbins, F. S., and Whipple, G. H., PROC. SOC. EXP. BIOL. AND MED., 1939, **41**, 361.

[2] Madden, S. C., Noehren, W. A., Waraich, G. S., and Whipple, G. H., *J. Exp. Med.*, 1939, **69**, 721.

[3] Weech, A. A., and Goettsch, E., *Bull. Johns Hopkins Hosp.*, 1938, **63**, 154.

TABLE I.
Effect of Supplements of Methionine and Phenylalanine on Hypoalbuminemia Induced by a Low Protein Diet.

Dog No.	Plasma albumin in g %: Initial	End 3-week depletion	End 1-week regeneration	End 2-week reg.	Supplement 1 g daily during reg.	Change in plasma albumin after 1-wk reg.
31	3.52	2.92	2.50	—	Phenylalanine	—.42
32	3.37	2.51	2.13	—	"	—.38
21	3.59	2.76	2.51	2.46	"	—.25
39	3.41	2.72	2.54	2.48	"	—.18
28*	2.76	2.03	1.96	—	"	—.07
36	3.08	2.48	2.45	2.28	"	—.03
29*	2.79	1.28	1.42	—	"	+.14
			Potency value		—0.02 ± 0.051	
29	2.63	2.16	2.19	2.19	Methionine	+.03
35	3.52	2.66	2.74	2.53	"	+.08
2	3.50	2.42	2.51	2.53	"	+.09
28	3.35	2.61	2.72	2.99	"	+.11
9	3.44	2.27	2.45	2.39	"	+.18
2*	3.40	2.27	2.55	—	"	+.28
9*	2.63	1.79	2.12	—	"	+.33
			Potency value		0.307 ± 0.028	

*Indicates observations made Sept.-Oct., 1939; all others, Dec.-Jan., '39-'40.

Fourteen dogs were used for the study and the above procedure[3] followed in all details. Total protein, albumin and non-protein nitrogen were run on the plasma from blood taken at the beginning and end of 3-week depletion on the low protein diet, and after one week regeneration. A few observations were made after 2 weeks' regeneration. Supplement consisted of 1 g dl-methionine* or 1 g dl-phenylalanine* added daily to the 53 g per kilo of the basal diet. Table I gives the summarized findings.

The 7 dogs fed 1 g methionine showed an average increase in serum albumin of 0.157 g %. If the Weech and Goettsch figure of 0.15 (to compensate for the fall in albumin that would have been observed during the 4th week if the supplement had not been fed) is added, the potency value of methionine becomes 0.307 ± 0.028. Phenylalanine resulted in an average drop of −0.17 g %; to which is added 0.15 for a potency value of −0.02 ± 0.051. Studies in this laboratory would assign a potency value of 0.476[4] to casein. Thus, 1 g methionine under the conditions of the experiment resulted in almost as much increase in serum albumin as did casein, while phenylalanine was not at all effective.

* Purchased from Eastman Kodak Company; amino nitrogen (van Slyke) content of methionine 9.37% or 99.8% of theoretical; of phenylalanine 8.52% or 100.4% of theoretical.

4 Mueller, A. J., Kemmerer, K. S., Cox, W. M., Jr., and Barnes, S. T., *J. Biol. Chem.*, in press.

We have had no previous experience with 2 weeks' regeneration, and it is not a part of the Weech and Goettsch procedure. In this instance the change in serum albumin after 2 weeks' regeneration confirms the distinction between methionine and phenylalanine. Other amino acids are being studied in this manner and will be reported later.

11377 P

Role of Particulate Matter in Perfusion of Blood Vessels.*

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A series of perfusion studies were made in which the capillary vessels of the frog's mesentery were kept under observation through the microscope. Striking differences were found between the circulation obtained with perfusates containing particulate matter and that obtained with similar solutions which were particle-free. Colloidal Ringer perfusates free of particulate matter did not fill all the vessels of the capillary bed, circulating only through the a-v capillaries. In a previous publication,[1] it was pointed out that the a-v capillaries represent direct continuations of the arterioles and serve as bridging channels to the venules. The dye T-1824 (Evans blue, Eastman Kodak Co.) has been used for blood volume studies because of its poor diffusibility.[2] When solutions containing Evans blue were used, the restriction of the color to the a-v capillaries stood out in contrast to the true capillaries which remained colorless. The addition of particulate matter, either as a fine suspension of carbon or of washed, rooster red cells, to the Ringer-gelatin or Ringer-acacia perfusates altered the restricted circulation within 30 to 45 seconds by distributing the solution throughout all of the capillaries.

During the early stages of the perfusion with particle-free Ringer-gelatin solutions, it was observed that the true capillaries were quickly emptied of their contained blood cells. This was peculiar since other observations had shown that the circulation of such perfusates

* This study was made possible by a grant from the Josiah Macy, Jr., Foundation.

1 Zweifach, B. W., *Anat. Rec.*, 1939, **74**, 475.

2 Gregerson, M. I., and Gibson, J. G., *Am. J. Physiol.*, 1937, **120**, 494.