until now have been considered the richest known sources of biotin. Preliminary studies indicate that in the successive steps of purification of virus, a marked concentration of biotin occurs, parallel with the increase in viral activity. Further studies are needed to establish the degree of hydrolysis necessary for complete release of biotin from vaccine-virus.

The fact that a bacterial growth-factor is associated with elementary bodies of vaccinia is important, but definite proof that such a substance represents an integral part of the virus constitutes a larger problem. Studies on the possible rôle of biotin and other growth-catalysts in the metabolism of vaccine-virus are under way, and will be reported in a later communication.

11791

Blood Volume in Cobalt Polycythemia.

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Cobalt polycythemia was first produced in rats by Waltner and Waltner.[1] Orten, *et al.*,[2] reported that cobalt polycythemia in the rat was accompanied by a definite increase in blood volume which was due to an increase of cell volume.

We have often produced polycythemia in dogs by feeding cobaltous chloride[3] but have only recently made blood volume determinations on such animals. It is the purpose of the present communication to report the results of these studies.

Procedure. Erythrocyte counts and hemoglobin percentages (Sahli) were determined regularly on 3 dogs which were fed a uniform diet of Purina dog chow. Blood volume was determined by the method of Keith, Rowntree, and Geraghty[4] using the dye brilliant vital red (Evans). Blood samples were drawn from the external saphenous vein while the dogs were lying quietly on a table,

1 Waltner, K., and Waltner, K., *Klin. Wochenschr.*, 1929, **8**, 313.

2 Orten, J. M., Underhill, F. A., Mugrage, E. R., and Lewis, R. C., *J. Biol. Chem.*, 1933, **99**, 457.

3 Davis, J. E., *Am. J. Physiol.*, 1938, **122**, 397; 1939, **127**, 322; 1940, **129**, 140.

4 Keith, N. M., Rowntree, L. G., and Geraghty, J. T., *Arch. Int. Med.*, 1915, **16**, 547.

at least 15 hours after the previous daily dose of cobalt. Polycythemia was produced by the daily administration of 2 mg of cobalt per kg, in the form of a dilute solution of cobaltous chloride, by stomach tube.

Results. Fig. 1 shows changes in blood volume and blood cell volume of 3 dogs before and after the onset of cobalt polycythemia. The dashed lines indicate varying periods of time which elapsed between the commencement of cobalt administration and the attainment of polycythemia in the different dogs. It will be seen in Fig. 1 that cobalt induced a significant increase of blood volume, and an even more pronounced increase in the volume of cells in the circulation (average increase, about 20%). The average normal control values for blood volume in these dogs ranged from 8.5 to 9.0% of their body weights.

That polycythemia was produced in these dogs is shown in Table

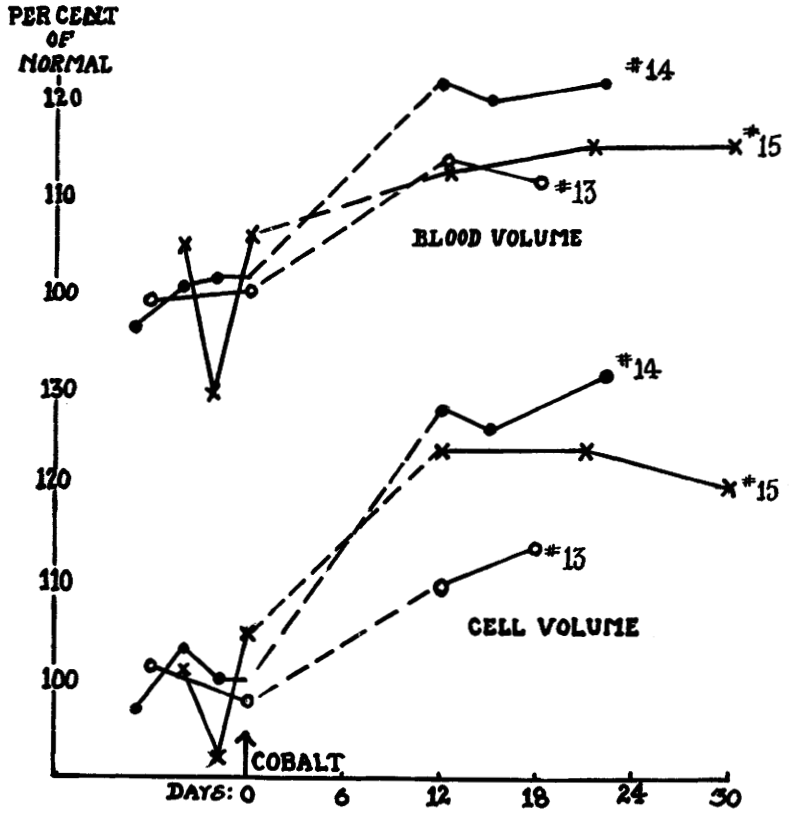

FIG. 1.

Changes in blood volume (above), and blood cell volume (below), in 3 dogs with cobalt polycythemia.

TABLE I.
The Production of Polycythemia by Cobalt in the 3 Dogs Whose Blood Volume Changes are Shown in Fig. 1. Erythrocyte Numbers Are Given in Millions.

	Dog No. 13	Dog No. 14	Dog No. 15
Before Cobalt	5.17	5.78	5.07
	5.26	5.81	5.16
	5.06	5.75	5.28
			5.09
After Cobalt	5.93	6.75	6.29
	6.07	6.84	6.32
	6.22	6.72	6.25
	6.13	6.77	6.30

I, which presents erythrocyte numbers observed before and after the production of cobalt polycythemia. The increases are not great but are significant, ranging from 17 to 22%.

These experiments on dogs confirm, in a qualitative way, the work of Orten, Underhill, Mugrage, and Lewis,[2] which was done on rats.

Conclusion. Cobalt polycythemia in the dog is accompanied by an increase of blood volume which is due chiefly to an increased volume of cells.

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Adenomatous Stomach Lesion of the Rat Associated with Heavy *Cysticercus fasciolaris* Infestation.*

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In connection with an extensive compilation of their data on spontaneous tumors of the rat, Bullock and Curtis[1] recorded the interesting observation that a hypertrophic gastritis was frequently found in rats infested with large numbers of *Cysticercus fasciolaris,* the larval form of the cat tapeworm, *Taenia taeniaeformis (crassicollis).* Following the ingestion of the *Taenia* eggs by the rat, the oncospheres localize in the liver, where they lead to the formation of cysts from which the well-known *Cysticercus* sarcomas often develop.[2] The gastritis seems to be definitely associated with the

* This investigation was aided by a grant from William R. Warner and Co., Inc., New York City.

1 Bullock, F. D., and Curtis, M. R., *J. Cancer Res.*, 1930, **14**, 1.

2 Bullock, F. D., and Curtis, M. R., *Proc. New York Path. Soc.*, n.s., 1920, **20**, 149.