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Reduction of Blood Volume Following Bilateral Oophorectomy.

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(Introduced by Robert T. Frank.)

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The present work was stimulated by the striking changes in blood volume found in patients with thrombo-angiitis obliterans by Silbert, Kornzweig and Friedlander.[1] The fact that this condition rarely occurs in women suggested that some physiological difference accounts for their immunity. It was natural to assume that the ovaries might be responsible for this difference. The occurrence of repeated attacks of superficial phlebitis in the lower extremities during the years following the removal of the ovaries has been observed by us and by others. Some alteration in the blood may play a rôle in producing this manifestation. Although several investigators have reported changes in the chemistry of the blood after bilateral oophorectomy, none have included a simultaneous study of the blood volume.[2, 3]

The present report includes a presentation of data on blood volume, viscosity, cholesterol and fibrinogen in 25 patients who have had surgical removal of both ovaries and the uterus, and a miscellaneous group of 27 patients comprised as follows:

Natural menopause	9
Artificial menopause produced by radiotherapy	8
Recurrent amenorrhea	1
Single oophorectomy	2
Miscellaneous operative cases	6
Pre-operative case	1

Blood volumes on about 50 normal individuals gave an average figure of 80 to 85 cc. per kilo. The same results were obtained by other investigators.

The dye method of Lampe modified by Rosenthal was employed, as described by Silbert, Kornzweig and Friedlander.[1] The cholesterol determinations were made by the method of Bloor and the

[1] Silbert, S., Kornzweig, A. L., and Friedlander, M., *Arch. Int. Med.*, 1930, **45**, 948.

[2] Geist, S. H., and Goldberger, M. A., *Am. J. Obstet. and Gyn.*, 1926, **12**, 2.

[3] Bailey, H. C., *Am. J. Obstet. and Gyn.*, 1921, **2**, 1.

fibrinogen tests by the new Wu method. The Hess apparatus was used in estimating the viscosity.

The average blood volume in the bilateral oophorectomy cases shows a reduction of about 25% from the normal figure. This change becomes more striking after the first few months. Coincident with this there is an elevation in the cholesterol and fibrinogen content of the plasma, and an increase in the viscosity. Since the cholesterol and viscosity figures are easily altered by physiological changes, such figures should not be given too much weight. However, in our cases there is a consistent tendency for these figures to be higher and they are supported by the diminished blood volumes.

In only one patient who had a bilateral oophorectomy was a normal blood volume obtained. Here, there was definite clinical evidence of hyperthyroidism and the basal metabolism was +47%. The normal blood volume in this case is probably due to the increased thyroid activity. Silbert and Friedlander[4] have pointed out that restoration of normal blood volume in thrombo-angiitis obliterans cases can be brought about by the administration of thyroid extract.

Corresponding studies of the miscellaneous control group reveal blood volume figures which are within normal limits. This group includes 17 patients with normal or artificial menopause. It would appear, therefore, that some substance capable of influencing blood volume is produced by the ovary, even after other physiological functions have ceased.

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Individual Feather Succession in the Hybrid Capon.*

MARY JUHN. (Introduced by F. R. Lillie.)

From the Whitman Laboratory of Experimental Zoology, the University of Chicago.

The plumage of the F-1 males resulting from a cross in either direction between Barred Rocks and Brown Leghorns in general

[4] Silbert, S., and Friedlander, M., *J. Am. Med. Assn.*, 1931, **97**, 17.

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