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.

6887

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.

* The expenses of this investigation were supported in part by the Committee for Research in Problems of Sex of the National Research Council; grant administered by F. R. Lillie.

resembles that of the Barred Rock though the pattern is not strictly identical.

Spaced among the barred plumage are feathers, the so-called exceptional feathers, which may be completely identical with those of the Brown Leghorn male, or, while exhibiting both barred and leghorn characteristics in general, yet show a number of traits foreign to either parent. The occurrence of these exceptional feathers is practically entirely confined to the plumage regions in which barbules are restricted to the vicinity of the shaft and to the basal feather sections, the saddle, hackle, head and minor coverts.

The greater number of exceptional feathers possess a barred tip and leghorn base; the barred region may occupy one vane-half, or the margin only of the feather, in which case the transition takes place within individual barbs, and yet other variations.

Feathers similar to these have been described in hybrids resulting from a cross between Plymouth Rocks and Orloffs by Serebrovsky,[1] by Hertwig and Rittershaus[2] from a cross between Barred Rocks and Goldlack, and from a cross between Plymouth Rocks and Faverolles by Kuhn.[3]

Serebrovsky attributes the origin of the exceptional feathers to the loss of one sex-chromosome carrying the factors for barring in development; Hertwig and Rittershaus to the frequent loss of the part of the X-chromosome containing the factor which inhibits black and white regions of barred feathers. Both Kuhn and Hertwig and Rittershaus state that exceptional follicles always produce exceptional feathers identical in pattern with the exceptional feathers plucked.

In this laboratory the methods described in earlier papers for the identification of individual follicles were applied to 10 adult hybrid capons from the cross described above: a total of 186 individual feathers severally identified were followed through one regeneration. Of this number 102 barred feathers were replaced by barred; 26 barred by exceptional; 46 exceptional by barred and 8 exceptional by exceptional. No regeneration of exceptional feathers identical to the original were found.

Where the observations were continued to 2 successive regenerations, of the possible combinations 7 were found: barred × barred × barred 44; barred × barred × exceptional 11; barred × excep-

[1] Serebrovsky, A. S., *J. Genetics*, 1926, **16**, 35.

[2] Hertwig, Paula, and Rittershaus, Tine, *Arch für Geflügelkunde*, 1929, **3**, 65.

[3] Kuhn, Otto, *Z. für Züchtungskunde*, 1928, **3**, 615.

tional × barred 7; barred × exceptional × exceptional 4; exceptional × barred × barred 20.

These findings do not support the genetic interpretations advanced, which, incidentally, are untenable from an embryological point of view.

It therefore appears in greater harmony with the observations to consider the potentialities for both barring and leghorn as continually present in the plumage of the hybrid. The exteriorization of one or other character as well as the intermediate forms may be considered to rest upon the interaction of the genetic factors for these characters with variable morphogenetic factors such as rate of growth which has been shown to be effective in the production of variations in pattern in the feather[4] and in the entire plumage.[5]

Hence in identical physiological milieu regeneration of identical exceptional feathers may indeed be encountered. It also follows that determination of the plumage pattern of the hybrid should prove amenable to agents acting through the cytoplasm such as temperature, etc., and while considerable difficulties are to be expected, experiments along these lines are now under way.

6888

Experiments in Endobronchial Stenosis.

CORNELIUS B. WOOD. (Introduced by Elliott C. Cutler.)

From the Laboratory of Surgical Research, Harvard Medical School.

The production of bronchial stenosis by the simple method of the endobronchial application of a caustic has given rise to considerable experimental work. Adams and Livingstone painted the orifice of a bronchus with a 35% silver nitrate solution, which resulted in complete stenosis of that bronchus in a high percentage of attempts. This demanded repetition in view of the many possibilities for the application of such a method in clinical conditions.

Following the technique of Adams and Livingstone[1] we have failed to produce complete stenosis in either dogs or monkeys in experiments during the last 1½ years. Either we produced so great a

[4] Lillie, Frank R., and Juhn, Mary, *Physiol. Zool.*, 1932, **5**, 124.

[5] Juhn, Mary, and Gustavson, R. G., *J. Exp. Zool.*, 1930, **56**, 31.

[1] Adams, W. E., and Livingstone, H. M., *Ann. Surg.*, 1932, **95**, 106.