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Demonstration of the appearance after castration of cock-feathering in a hen-feathered cockerel.

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In the Seabright race of fowls the male is hen-feathered, *i. e.*, the feathers on the back of the neck (the hackles) and those on the posterior portion of the back (the saddle) are short and less elongated, like those of the female. When the Seabright male or female is crossed to fowls of another race in which the male has the characteristic male-feathering, the F_1 males are hen-feathered, or at least the dominance of hen-feathering is more or less complete. In the second generation there are three hen-feathered to one cock-feathered male.

It has been shown by Goodale that removal of the ovary of the hen or of the duck leads to the development of the male-feathering. I tried to discover whether the removal of the testes in the hen-feathered males would cause them to develop the hackles and saddle feathers of ordinary cocks. My first operations were unsuccessful, owing to failure to completely remove the testis. This autumn Dr. H. D. Goodale performed the operation for me on F_2 hen-feathered birds that I had reared. At the time of operation some of the saddle feathers were removed. The new feathers that appeared were like those on the ordinary cock bird; not only did they have the characteristic shape but were bright red also. The result leads to the apparently paradoxical conclusion that the removal of the testes of the hen-feathered cock caused him to develop certain characteristic feathers peculiar to the ordinary male.

The most probable interpretation of the effects of removal of the ovary of the hen (an operation that leads her to develop the male plumage) is that the ovary secretes some substance that holds in check the development of the male plumage. Likewise in the hen-feathered male it would seem probable that the testis produces some substance that inhibits the development of the complete male plumage. Possibly this substance is the same as

that produced in the hen that brings about in her the same result, although there is no direct evidence to show that this is the real explanation.

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Agglutination of bacteria in vivo; its relation to the destruction of bacteria within the infected host and to septicemia.

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An intravenous injection of immune serum causes an abrupt disappearance of the bacteria from the circulating blood of animals having a bacteremia or a septicemia. This is due to an immediate agglutination of the bacteria and to an accumulation of the bacterial clumps in the lungs, liver, spleen, etc. The clumps of bacteria are phagocyted and destroyed mainly by the polymorphonuclear leucocytes which accumulate in the internal organs following an intravenous injection of foreign protein substances. The septicemia or bacteremia does not recur as long as the immune serum is kept in the blood in a sufficient concentration.

These phenomena occur very typically following intravenous administration of specific immune sera in rabbits infected with pneumococci or Shiga dysentery bacilli. If the rabbits are actively immune to these bacteria, the same phenomena follow an intravenous injection of the bacteria. If the immune animals are given sufficient quantities of the bacteria, death may be caused by intoxication in the absence of a septicemia.

In natural immunity the above described phenomena follow immediately upon an intravenous injection of the bacteria. Rabbits have a comparatively high natural immunity to many bacteria, of which the following have been studied in this respect: typhoid bacilli, colon bacilli, dysentery bacilli of the Flexner group, *Staphylococcus aureus* and *albus*, non-virulent bacilli of the *mucosus capsulatus* group, and non-virulent influenza bacilli. All of these are agglutinated, phagocyted, and destroyed in normal rabbits as pneumococci are in immune rabbits and none of them causes a true septicemia in these animals.