X chromosome from the normal mother and the Y chromosome from their father, from which the allelic gene is absent.

When the daughters (carriers) are married to men with normal vision, some colour blind sons are formed. These affected sons receive their one X chromosome (in which the recessive gene is present) from their mother (carrier Cc).

If a colour blind woman is married to a normal man, all her sons are colour blind. The daughters are normal but they carry the recessive gene in one of their X chromosomes and they are carriers. When these daughters are married to a colour blind man, colour blind grandsons and grand daughters are produced in equal numbers. So it follows ***criss-cross inheritance.***

2. Haemophilia (Bleeder's disease)

1. It is a ***hereditary blood disease*** discovered by ***John Cotto*** in 1803.

2. This disease is characterized by ***delayed blood clotting.*** This is because of the absence of a factor in the blood called ***antihaemophilic globulin*** which plays an important role in blood clotting. In normal persons, the blood clots in 2 to 8 minutes. But in haemophilic patients, clotting is delayed for 20 minutes to 24 hours. Hence they bleed continuously from the wound. So haemophilia is also called ***bleeders disease.***

3. This disease appeared as a mutant in ***Queen Victoria*** and from her it was transmitted to her descendants. Hence this disease is common among the Royal family of Queen Victoria. So this disease is also called ***Royal disease.***

4. Haemophilia is a ***sex linked recessive character.***

5. It is caused by recessive genes represented by ***hh*** and the normal condition is due to dominant gene ***H.***

6. The genes are located on the X chromosome. The Y chromosome has no gene. So the male has only one gene for this character. So the male is called ***hemizygous.***

7. As other sex linked characters, it is common in men but rare in women.

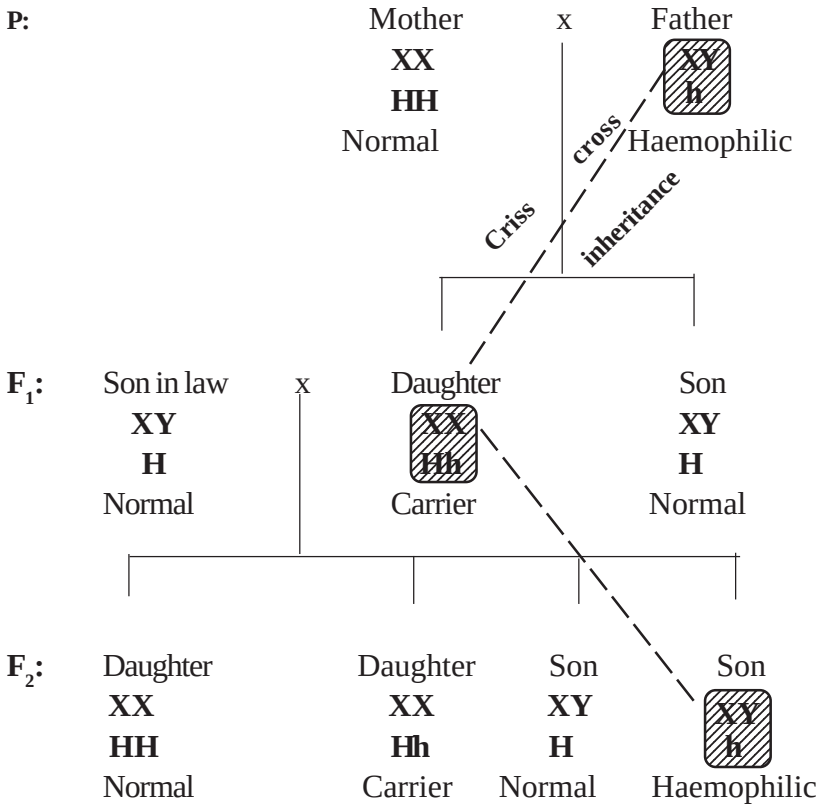

Fig.10.2: Inheritance of haemophilia.

8. Haemophilia follows ***criss-cross inheritance.*** It is transmitted from the father to his grandson through his daughter.

9. Generally haemophilic patients will die before reaching reproductive stage, if they are exposed to severe bleeding.

3. Eye Colour in Drosophila

In *Drosophila*, ***red eye*** colour (W) is dominant over ***white eye*** (w). The genes for eye colour are located in the X chromosomes. The Y chromosome does not carry any allele for eye colour.

T.H. Morgan in 1910 crossed a ***red eyed*** pure breeding female fly with a ***white eyed*** male. In the F_1 generation, all the offspring are red eyed.