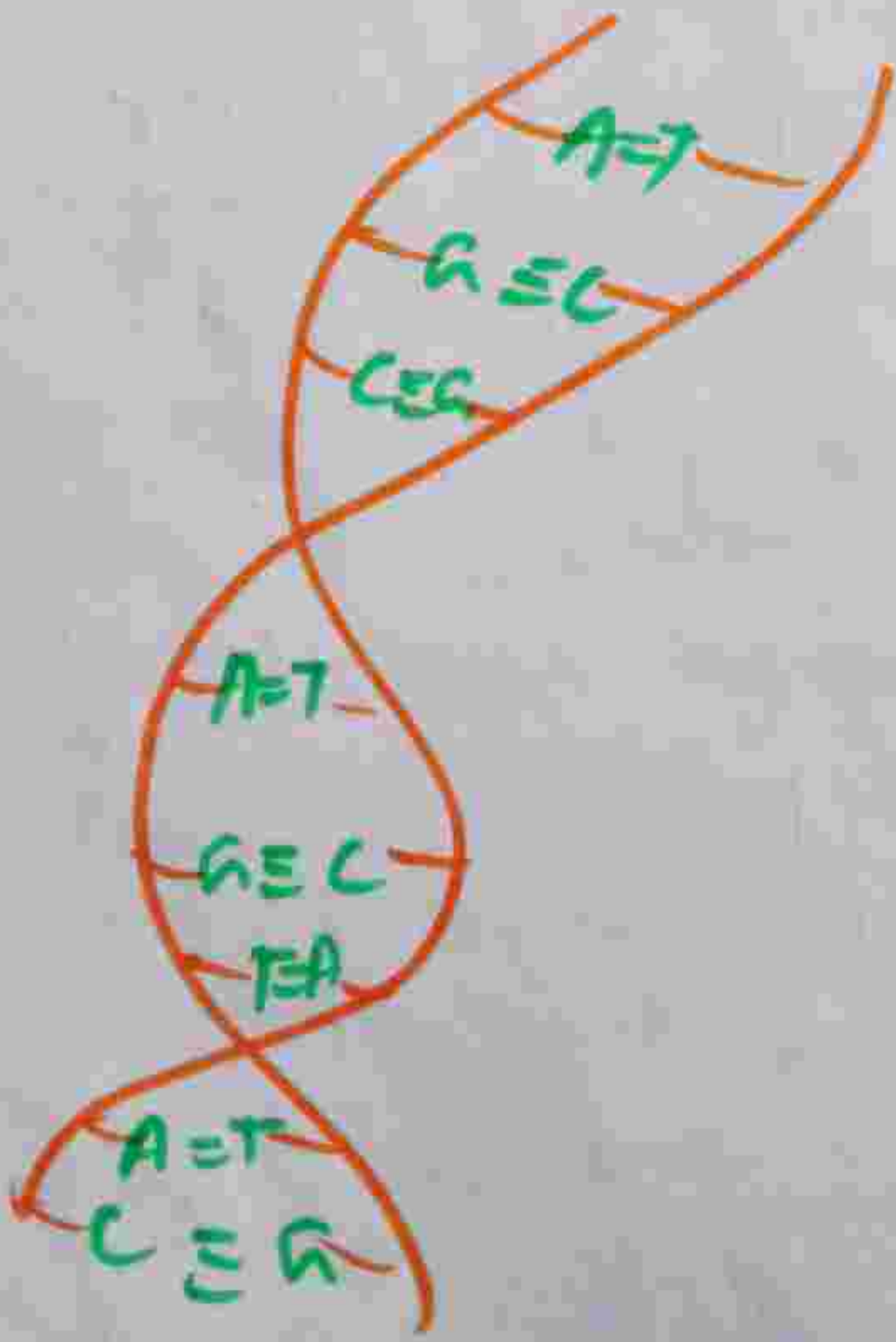
UNIT II

GENETICS

and

Evolution



Principles of Inheritance and Variation [02]

Some common Terms of Genetics.

- **Homozygous** — Term given by Bateson and Saunders

→ When the Alleles present of homologous chromosomes are of same type then called Homozygous condition.

i.e TT [Homozygous dominant]

tt [Homozygous recessive]

- **Heterozygous** — Term given by Bateson and Saunders

→ When Alleles present on Homo-logous are of contransting type then called Heterozygous condition

e.g Tt

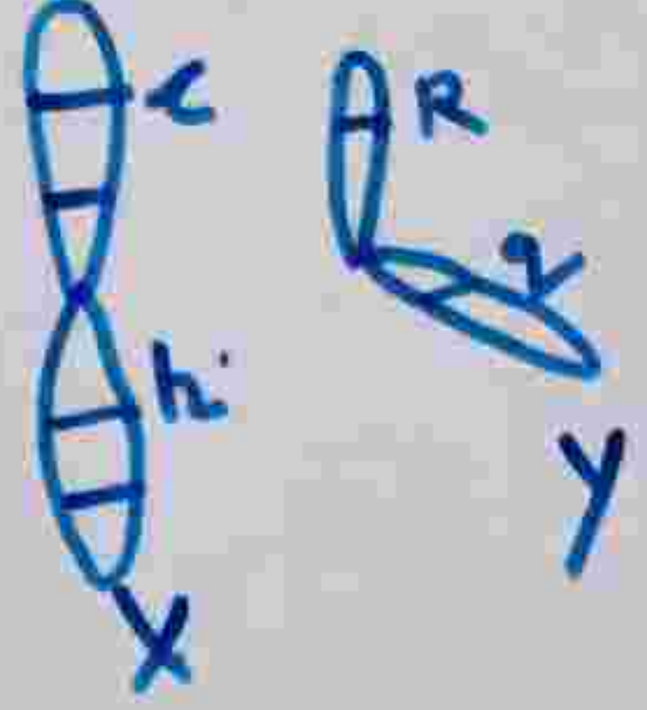
→ Hetrozygous individual are called Hybrid.

→ Hybrid may better results then called Hybrid Vigour.

- Hemizygous. - When any gene is present in single copy in diploid cell.

e.g In XY chromosomes the genes present on X chromosome and Y Chromosome are of different type

→ Genes of Haemophilia and colourblindness in males are Hemizygous. Present in single form



- Dominant Factor

The Allele that is expressed is Heterozygous form

→ Presented by capital letter T

- Recessive factor

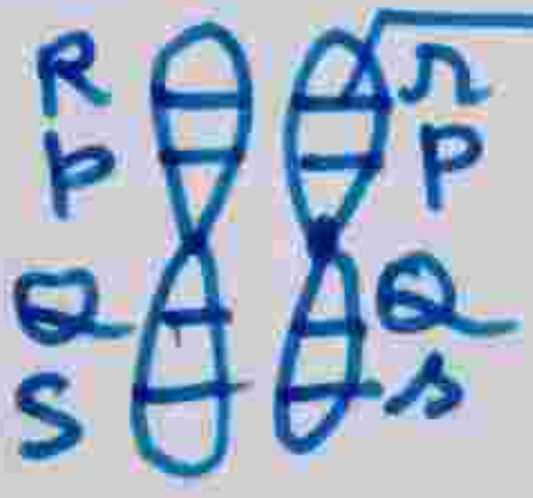
The Allele that is not expressed in Heterozygous form

Presented by small letter t

- Non Alleles — Alleles present at different Locus [Position] on same chromosome.

P, q, R, s are allele present on same chromosome but at different Locus.

- Gene Locus — Position of gene or allele on the chromosome.
→ Same type of Alleles are present at same Locus.



- Pure line — Pure line means True breeding individual.
→ Geneticaly pure or Homozygous
→ Term Pureline was given by Johannsen
TT or tt are called

→ Monohybrid cross

A cross made between individual having Pure line of contransting trait so that for one character

→ The individuals Obtained by Monohybrid cross are called Monohybrid.

e.g

Parents → (Tall) TT ♂ × tt ♀ (Dwarf)

Gamete → T T × t t

F1 generation → Tt Tt Tt Tt

All are Monohybrid

All are Tall.

Here → The character is Height

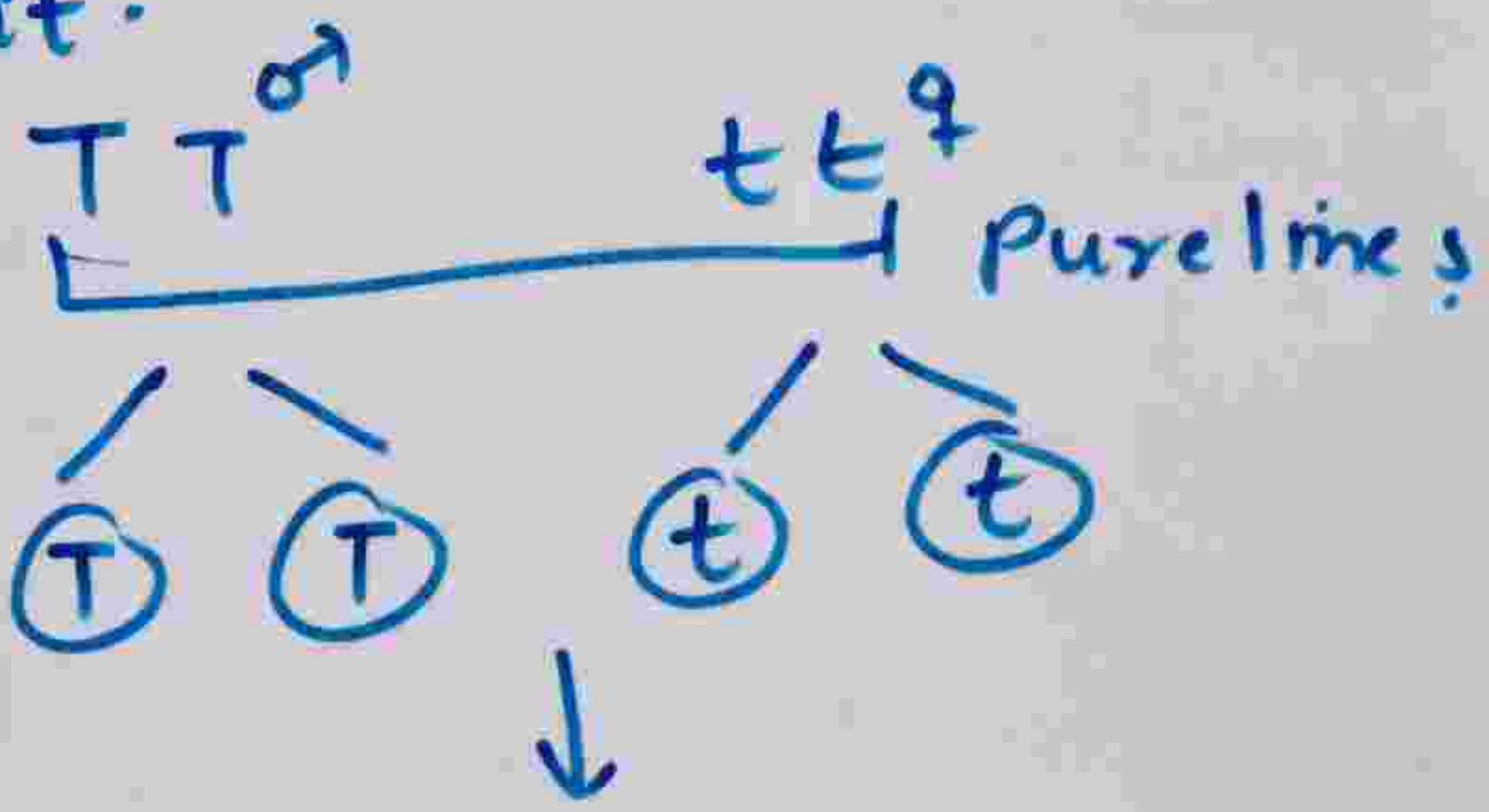
→ The Traits are — Tall (TT)
\ Dwarf (tt)

→ Hybrid Tt

F_1 Generation — First filial generation

↳ Term given by Bateson

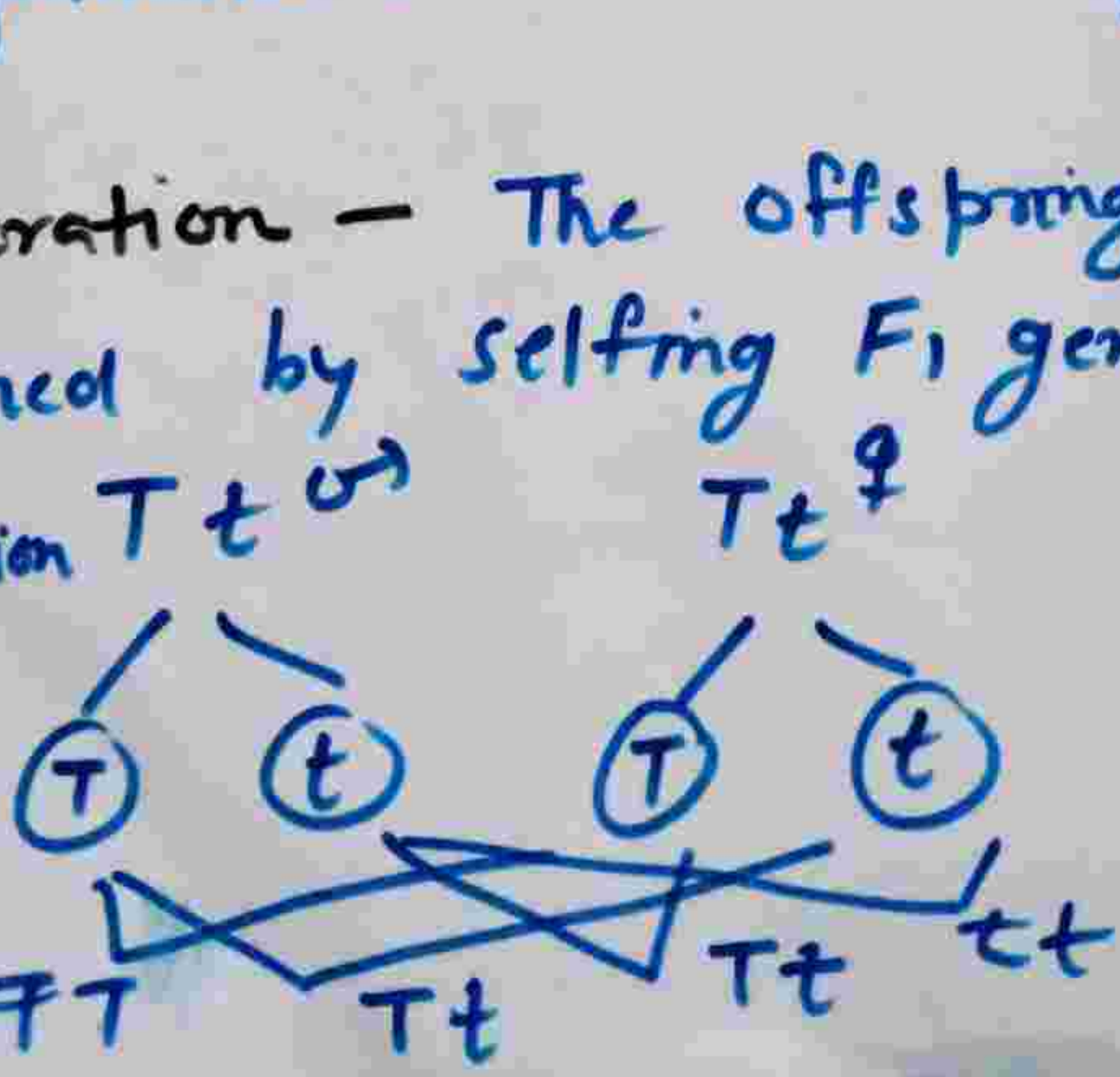
↳ F_1 generation represent offspring obtained by cross between Pure lines with contrasting trait.



F_1 generation → Tt [Hybrid]

F_2 generation — The offspring obtained by selfing F_1 generation

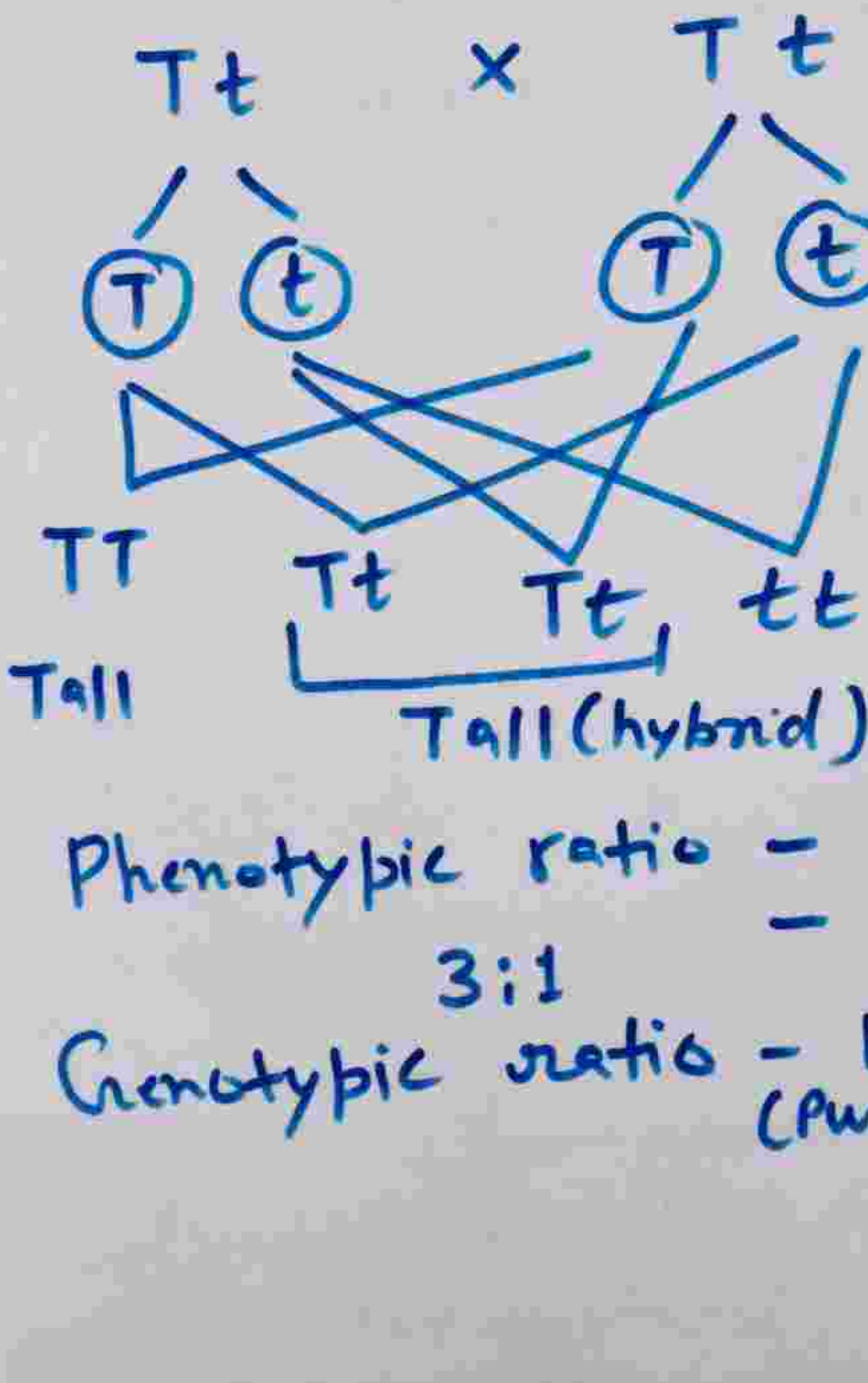
F_1 generation Tt ♂ Tt ♀



F_2 gener.

Monohybrid Ratio

The Ratio found by crossing of F1 generation or selfing of F_1 generation to obtain F_2 generation. it is Phenotypic ratio 3:1 and Genotypic ratio is 1:2:1



Phenotypic ratio – 3 (Tall)
– 1 (Dwarf)
3:1

Genotypic ratio – 1 : 2 : 1
(Pure tall) ↓ Dwarf
Tall hybrid

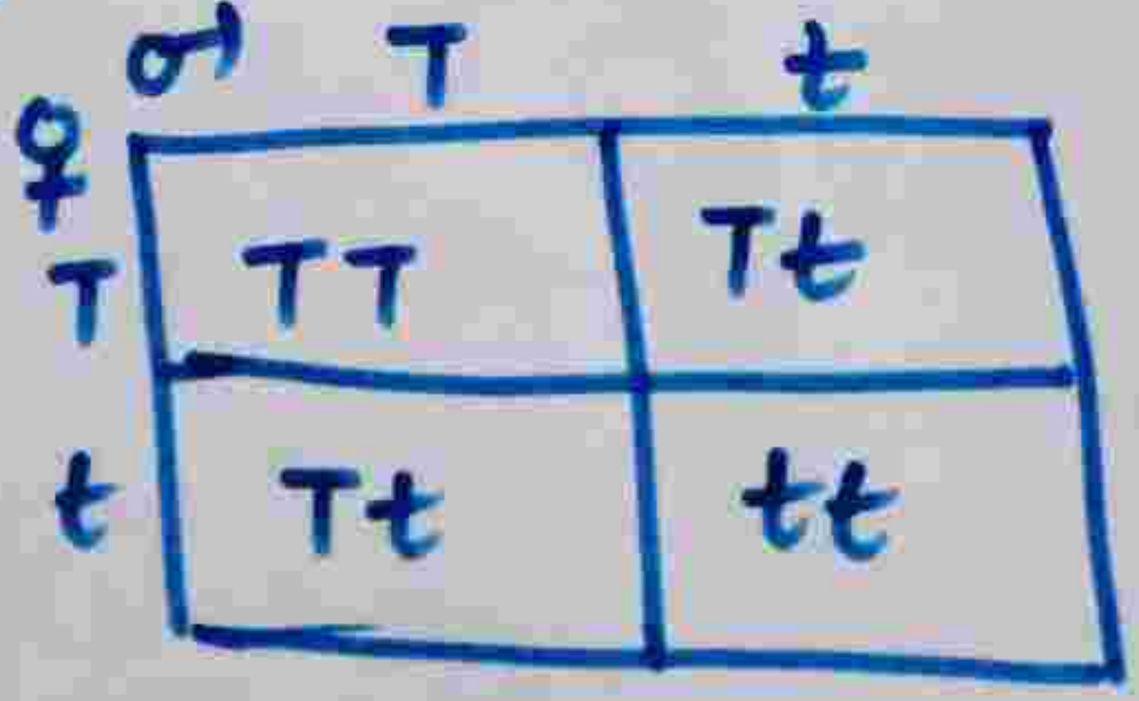
- Punnet square

→ Checker board divided into smaller square where all the possible type of gametes are shown.

→ Male gamete are present on Horizontal row and female gamete in vertical row

→ Gametes are fused to show Phenotype and Genotype.

→ Checker board by discribed by Punnet so called Punnet Square.



TT (Tall) Tt (Tall hybrid) tt (Dwarf)

Phenotype ratio 3:1

Genotypic ratio 1:2:1