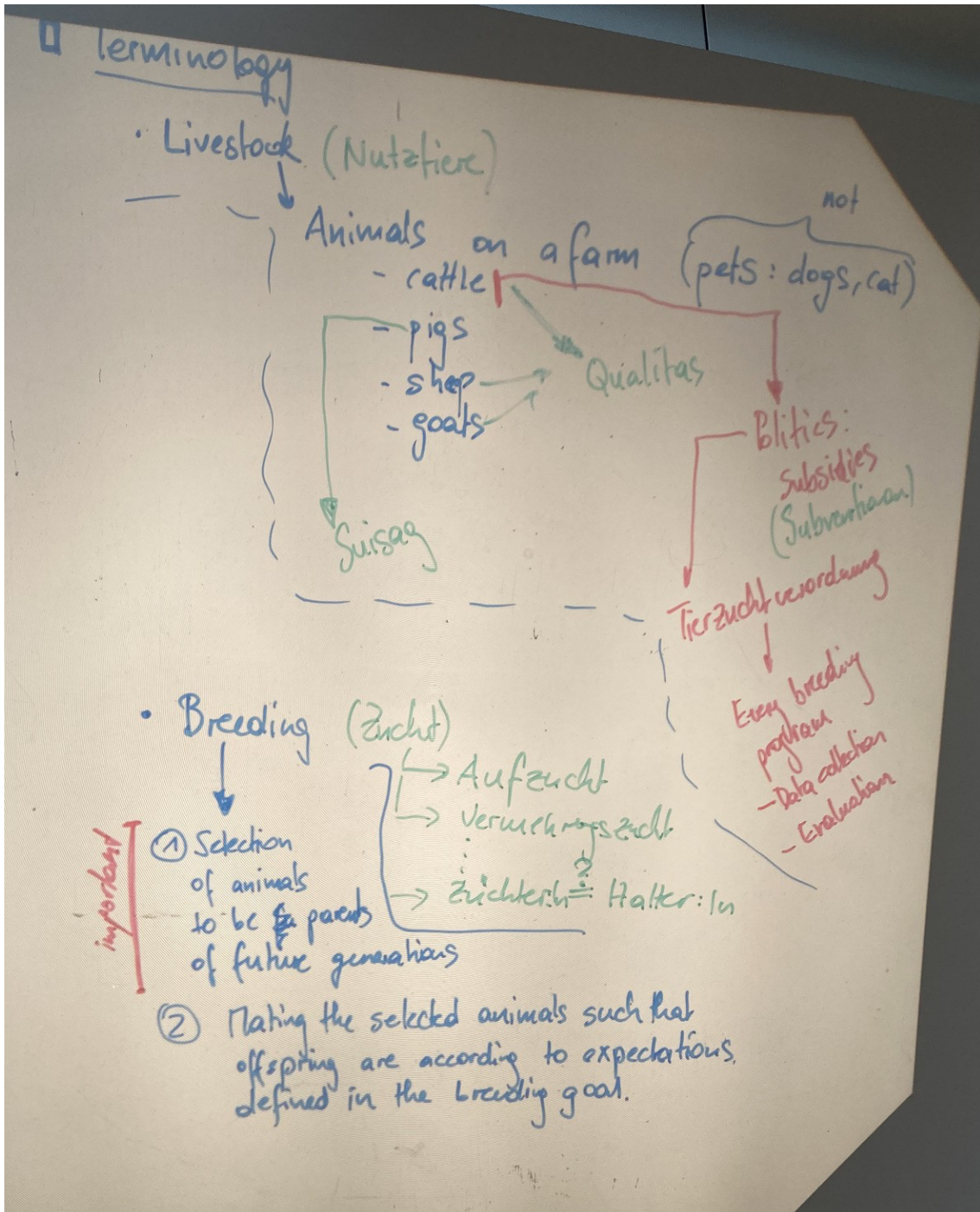
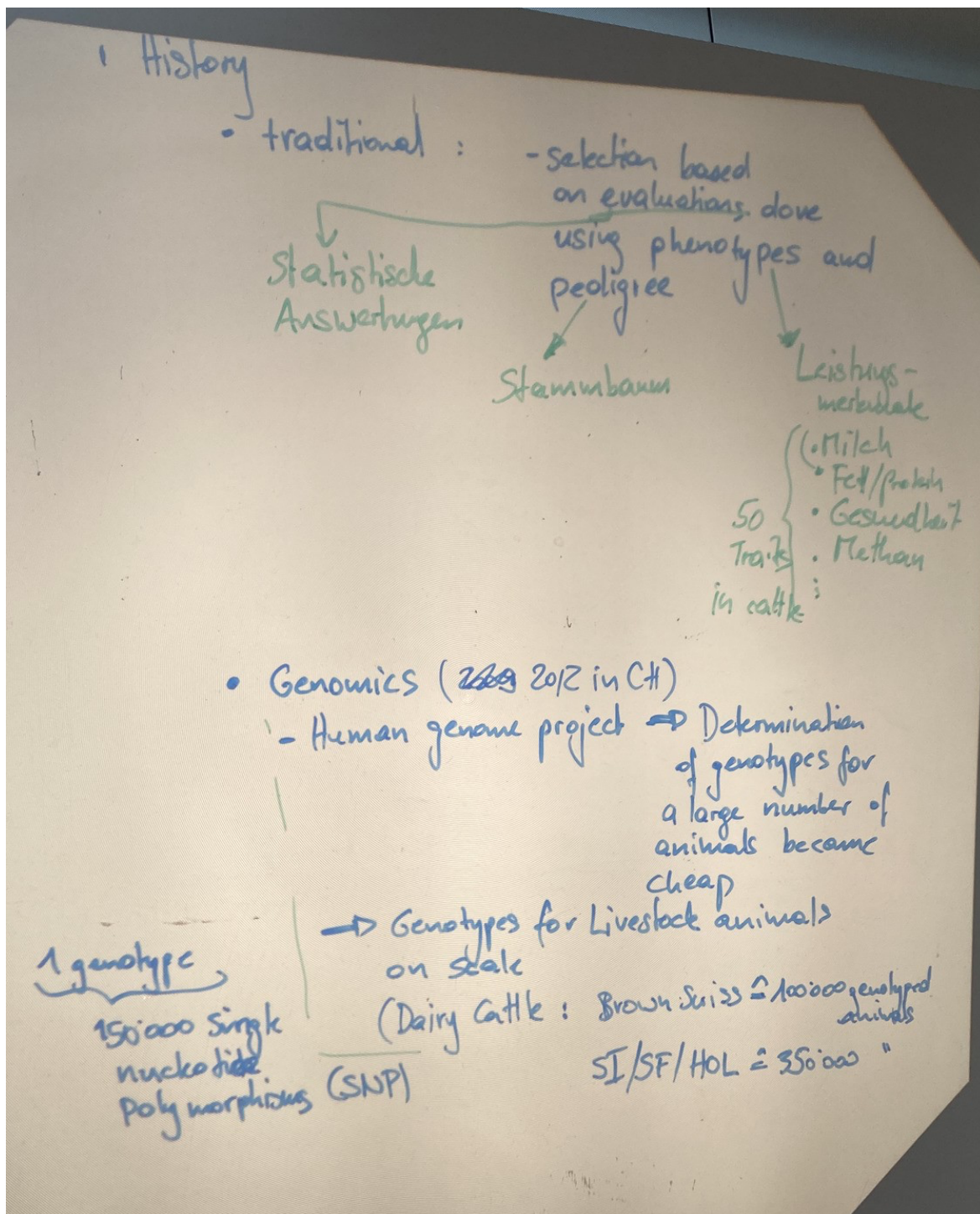


OHP Picture 1

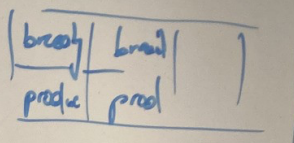
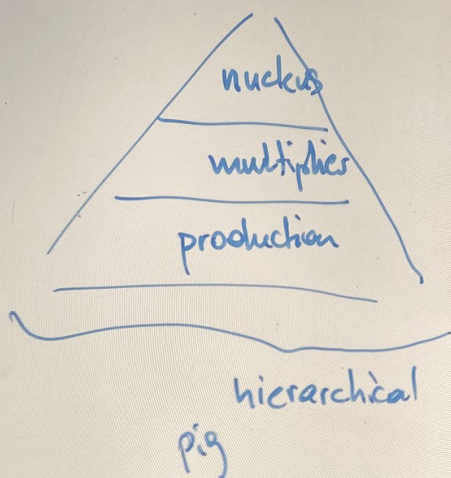




OHP Picture 3

- Establish difference between breeding and production. This is important to resolve possible conflicts of interest. More important in Cattle compared to pigs.

Structure

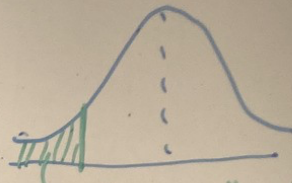


- In monolithic breeding program, the value of older animals is different with respect to the potential use
 - breeding \rightarrow young animals are more valuable
 - production \rightarrow older animals are most valuable, as long as they are healthy.

Success of a given selection strategy is quantified by the selection response (R)

$$R = i \cdot r \cdot \sigma_g$$

selection intensity



the smaller the surface the larger i

r : accuracy of the available information to describe genetic background
(statistics: correlation between information and the genetic value responsible for the trait)

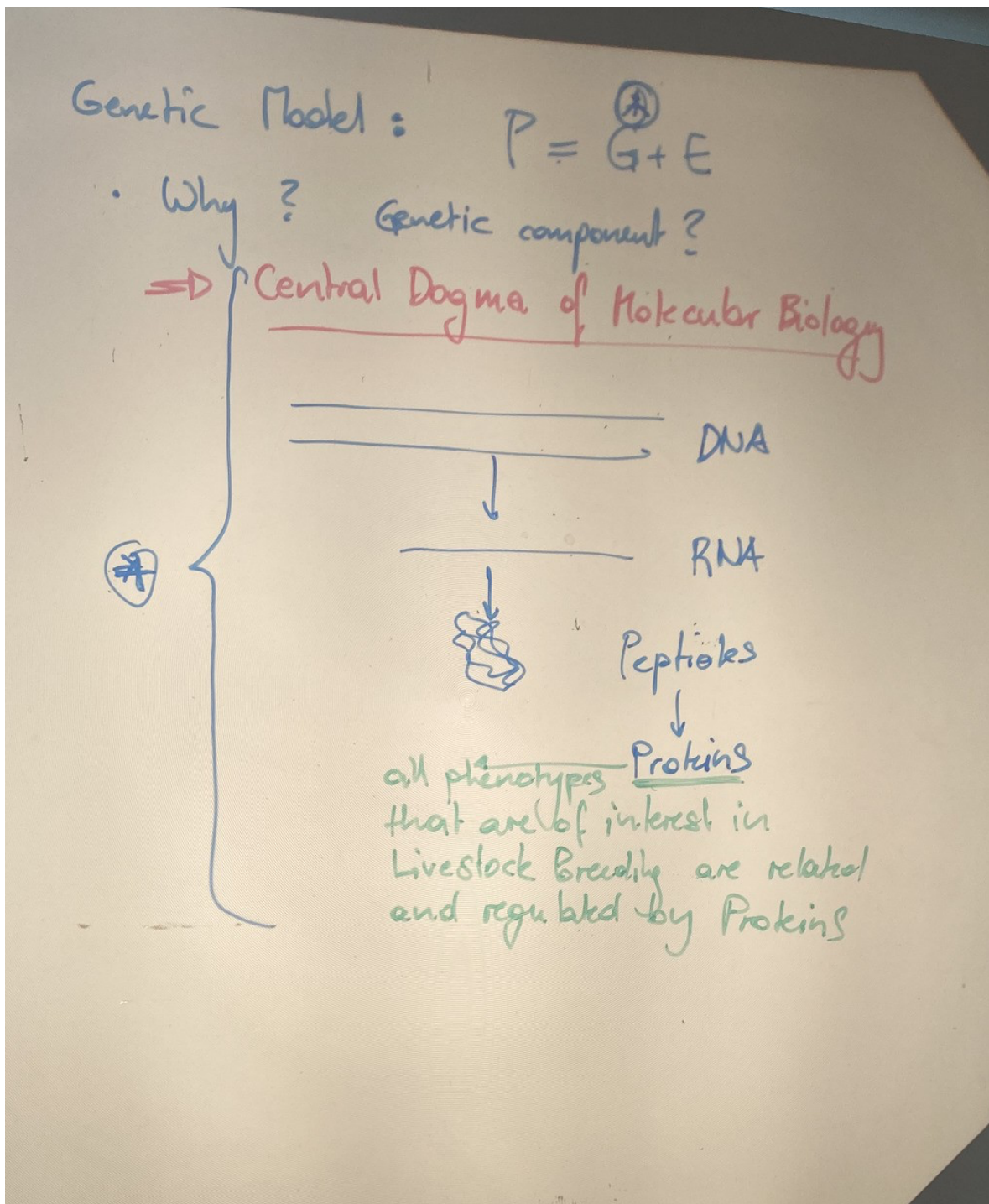
→ Example: information = phenotypic observation of methane

correlation is the square root of heritability

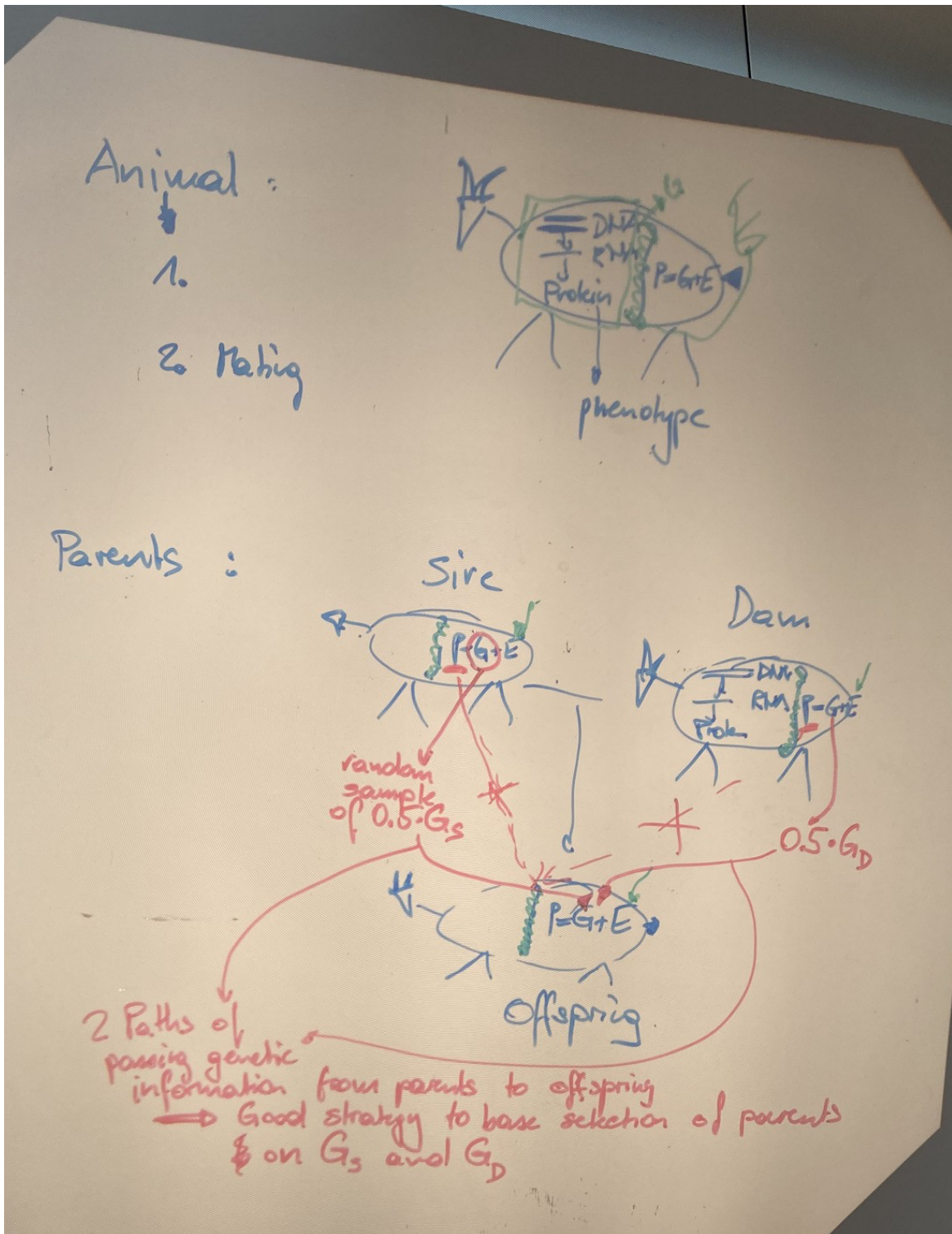
σ_g : genetic standard deviation

Conclusion

- Selection based on phenotypes alone is sub optimal, because parents do not pass phenotypes to offspring. But they pass random sample of alleles.
- How to quantify genetic potential of an animal with respect to a certain trait? Genetic background/potential is important for selecting animals as parents.
- Genetic potential of animals can still not be observed. Despite all available genomic information.
→ Model the relationship between phenotypic observations and genetic background.
- Genetic Model: $P = G + E$



OHP Picture 7

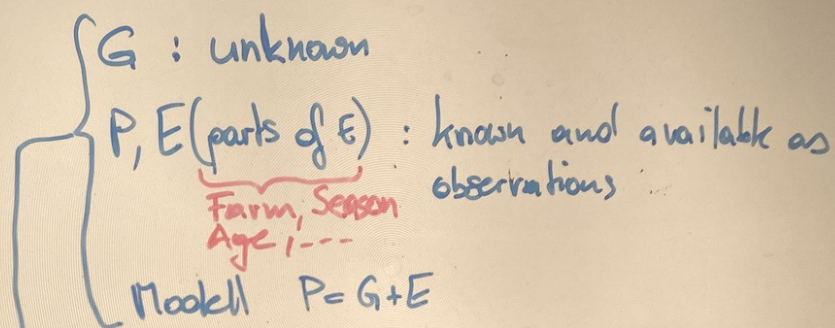


So far: Genetics

Given Model : $P = G + E$

Aim: Predictions about G based P and E

From statistics point of view:



Problem of estimating unknown parameter G
based on P and E

- BLUP : Best Linear Unbiased Prediction
- Bayesian methods

So far: ① Genetics

Given Model : $P = G + E$

Aim: Predictions about G based P and E

From ^② statistics point of view:

G : unknown

P, E (parts of E) : known and available as observations
Farm, Season, Age, ...

Model $P = G + E$

Problem of estimating unknown parameter G based on P and E

- **BLUP** : Best Linear Unbiased Prediction
- Bayesian methods

3: Computer Science