Meiosis

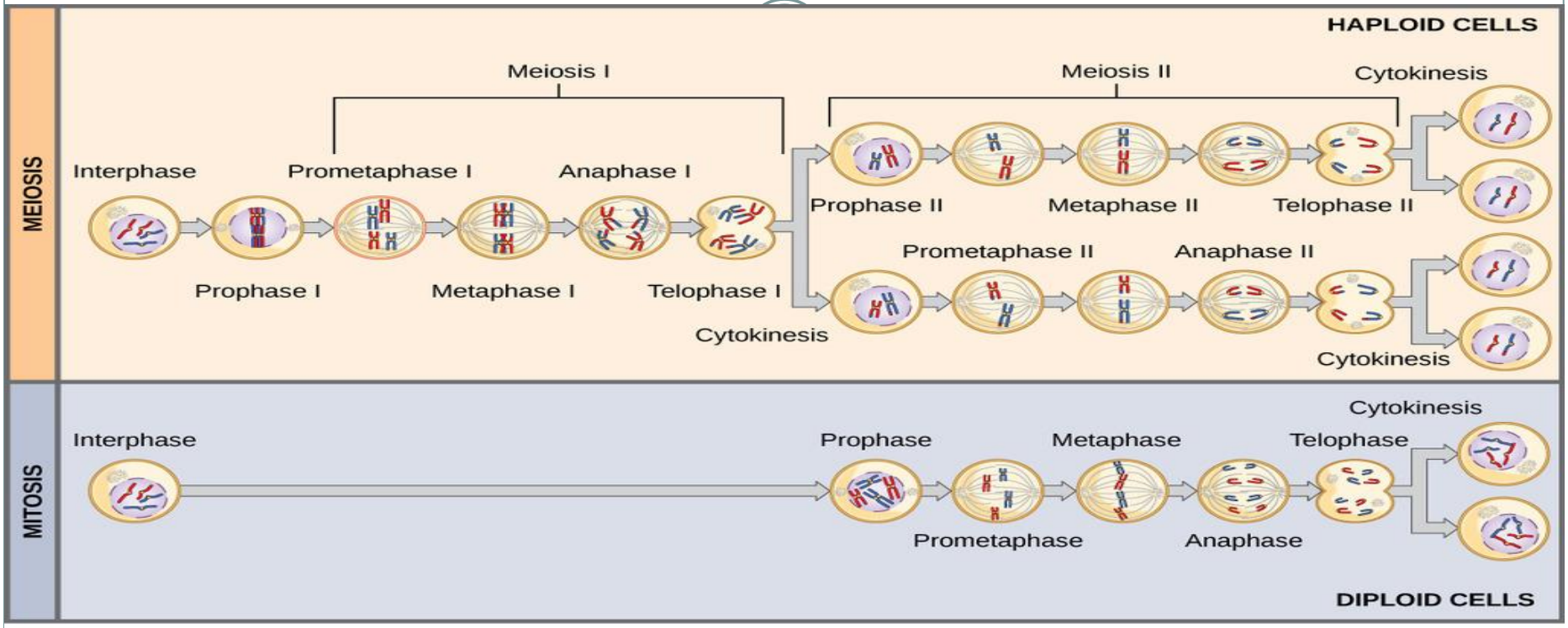
A REDUCTION DIVISION TO PRODUCE GAMETES WHICH ULTIMATELY MAINTAINS A CONSISTENT CHROMOSOME NUMBER IN THE SPECIES

PART 1

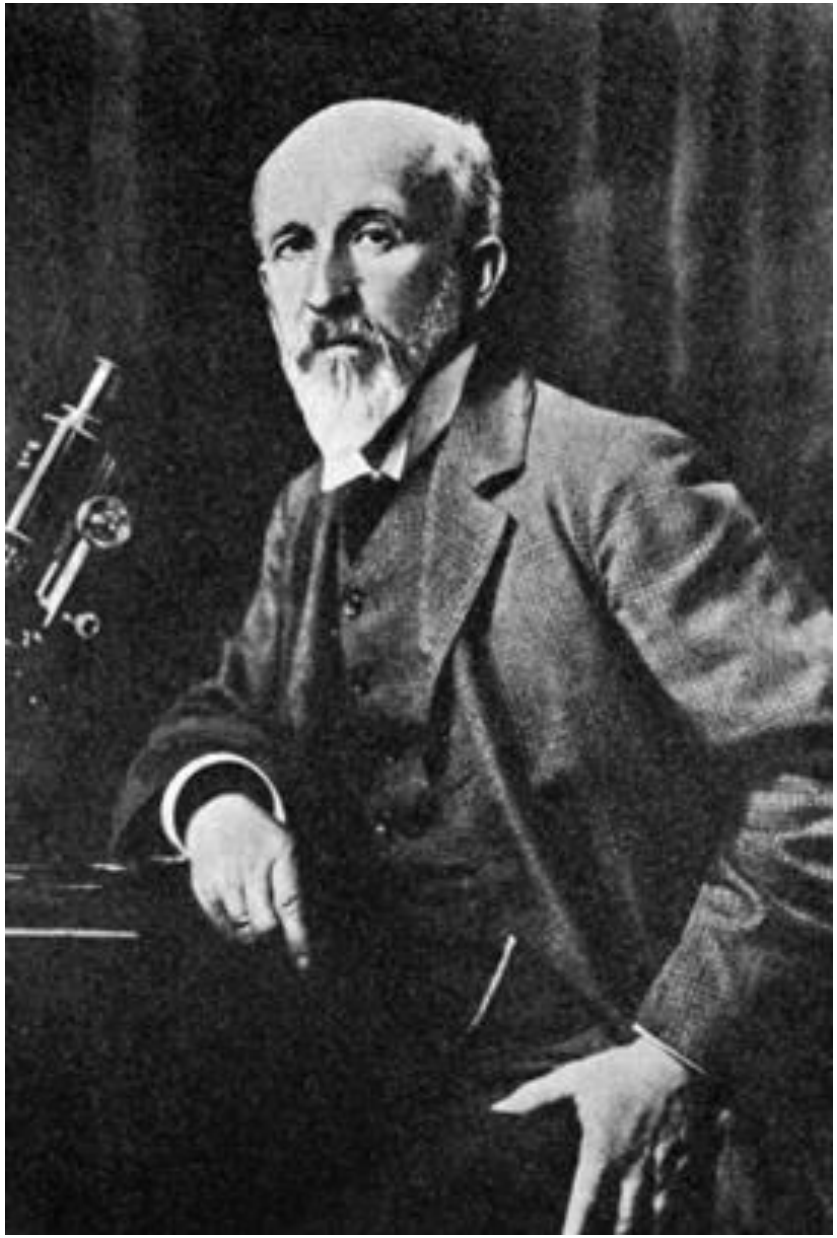
Types of Cell Division

- There are two types of normal cell division – mitosis and meiosis.
- Both types of cell division take place in eukaryotic organisms.
- Mitosis is cell division which begins in the zygote (fertilized oocyte) stage and continues in somatic cells during the life of the organism.
- Meiosis is cell division in the ovaries of the female and testes of the male and involves the maturation of primordial oocytes (eggs) and the formation of sperm cells, respectively.

Comparing Meiosis and Mitosis



						OUTCOME
PROCESS	DNA synthesis	Synapsis of homologous chromosomes	Crossover	Homologous chromosomes line up at metaphase plate	Sister chromatids line up at metaphase plate	Number and genetic composition of daughter cells
MEIOSIS	Occurs in S phase of interphase	During prophase I	During prophase I	During metaphase I	During metaphase II	Four haploid cells at the end of meiosis II
MITOSIS	Occurs in S phase of interphase	Does not occur in mitosis	Does not occur in mitosis	Does not occur in mitosis	During metaphase	Two diploid cells at the end of mitosis

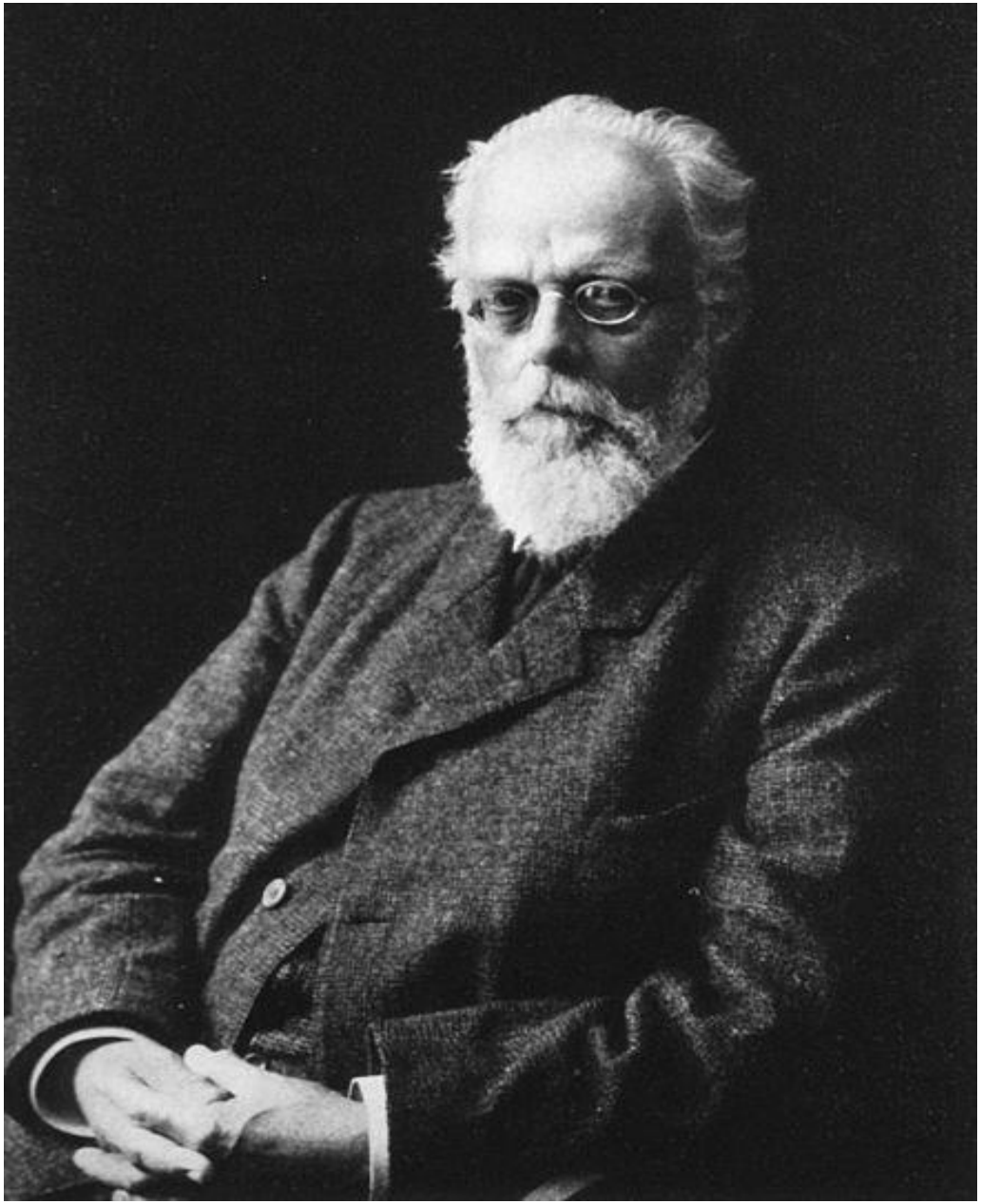


Wilhem August Oscar Hertwig (1849-1922)

- The first to teach that the chromosome was the physical basis of heredity.
- One of his greatest achievements was the discovery of the process of fertilization in sea urchins in which he observed and described cell division in 1876.

Edouard-Joseph-Louis-Marie van Beneden (1846 – 1910)

- Described a 2-phase cell division in 1883 in *Ascaris megalocephala* worm eggs
- Showed fertilization was the union of 2 half nuclei – one from the male and one from the female – producing a cell containing the full number of chromosomes for the species



Friedrich Leopold August Weismann (1834-1914)

- In 1886, Weismann predicted nuclear division would reduce the germ cell chromosome number by half to keep from progressively increasing the chromosome number at fertilization.
- This nuclear division later became known as meiosis which means “a reduction” in Greek.