



Mahidol University
Faculty of Medicine Siriraj Hospital



SI-NEURO

Basic Localization of Waveforms on the EEG

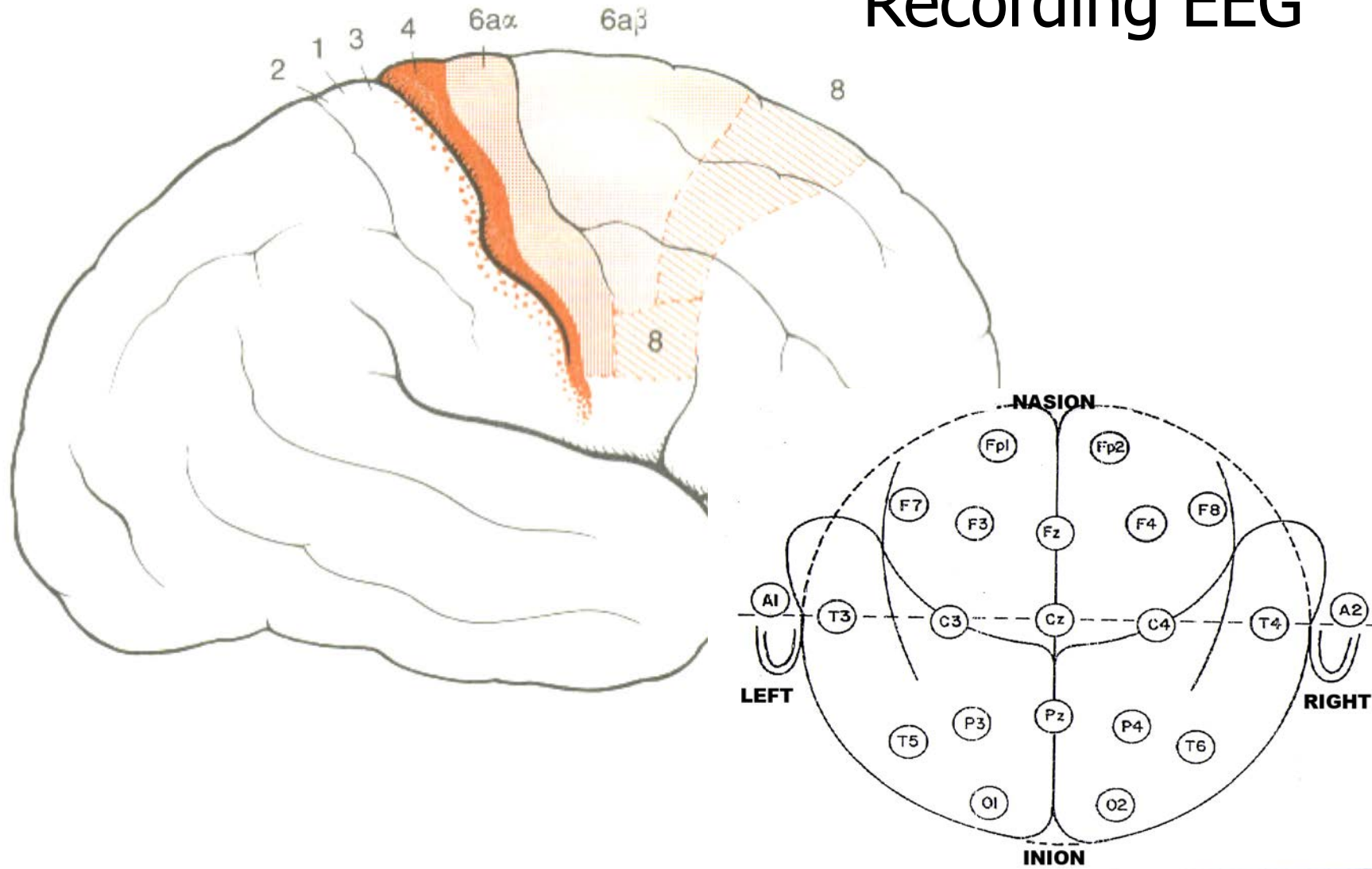
Kanokwan Boonyapisit, M.D.

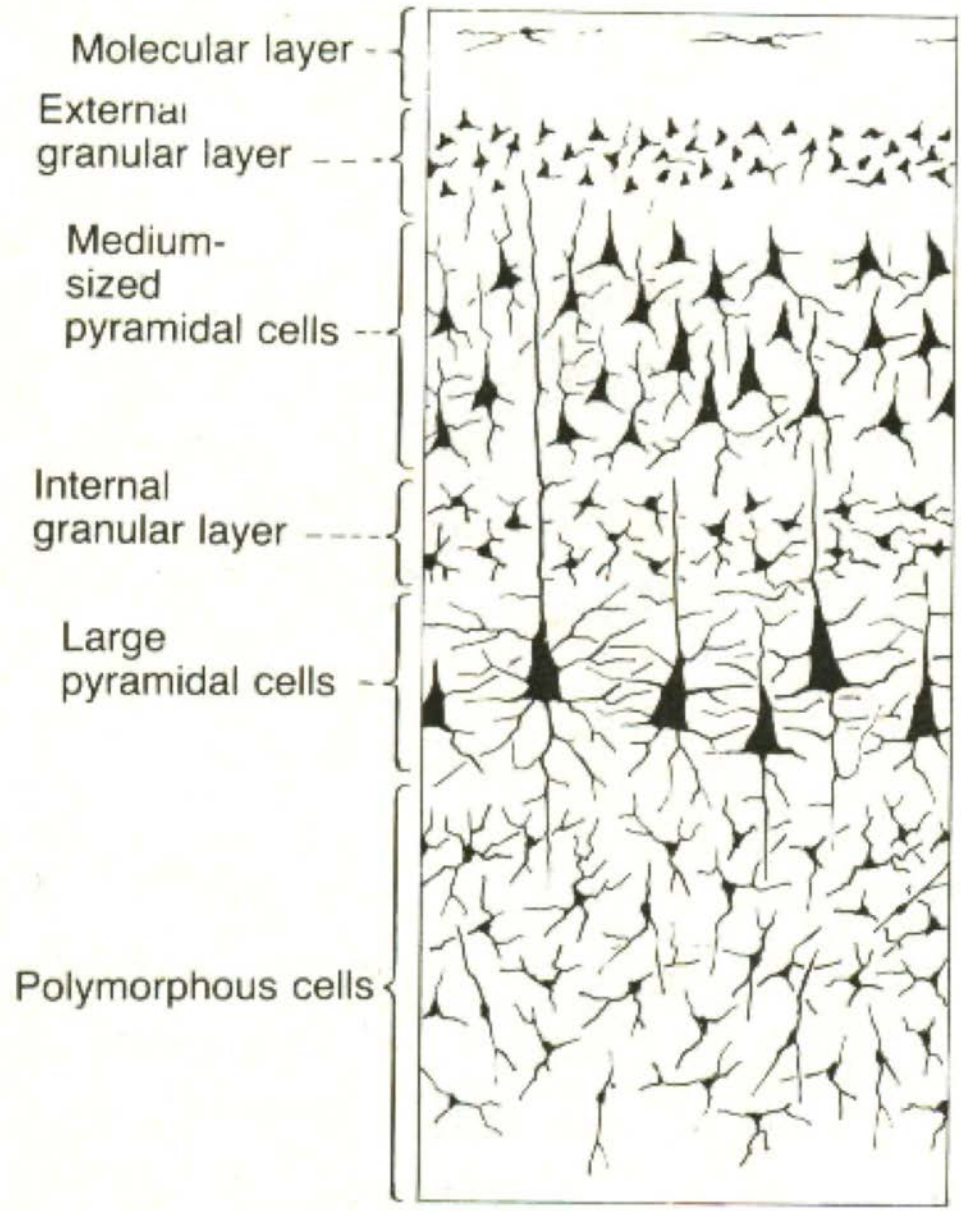


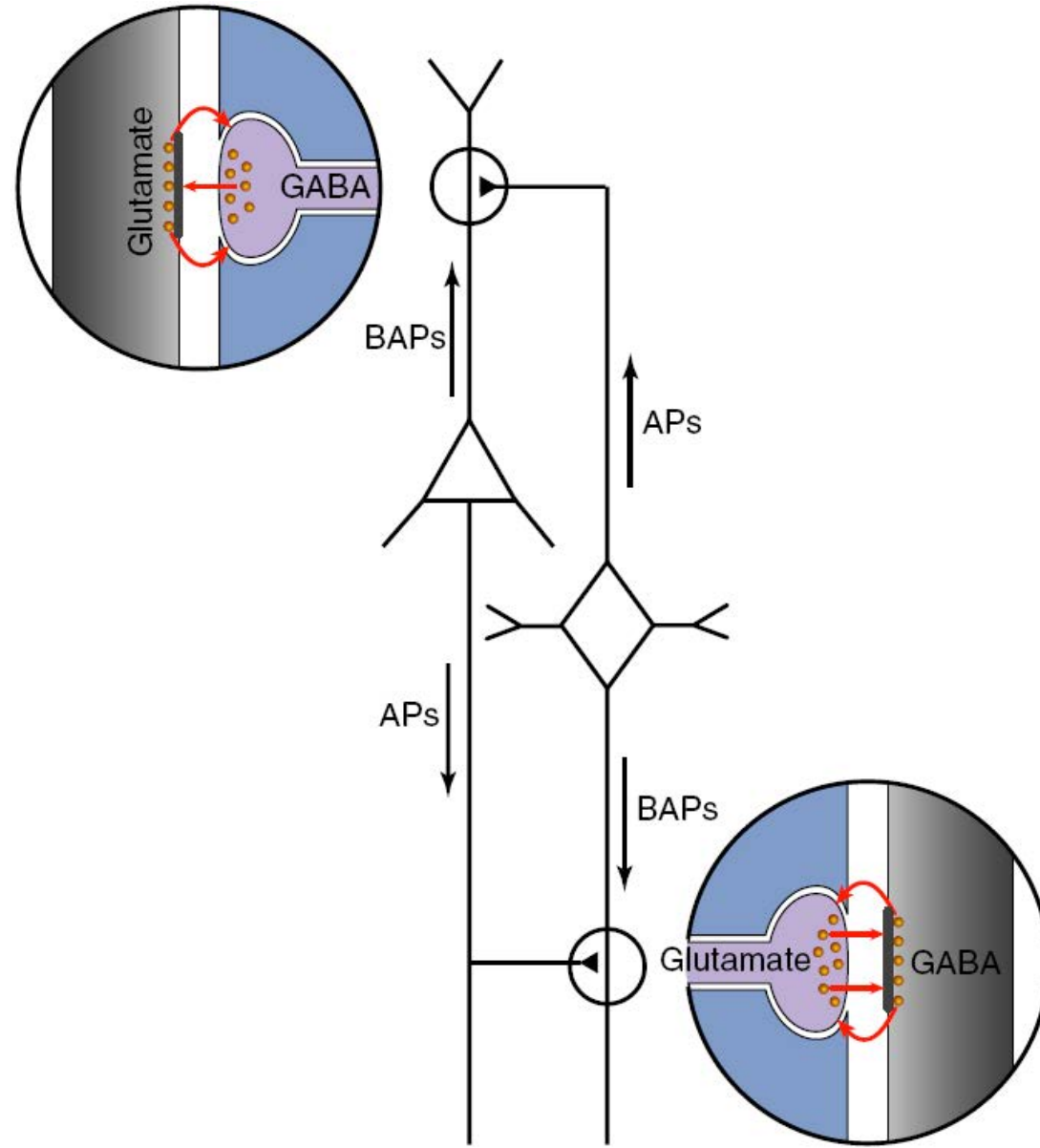
Origin of EEG

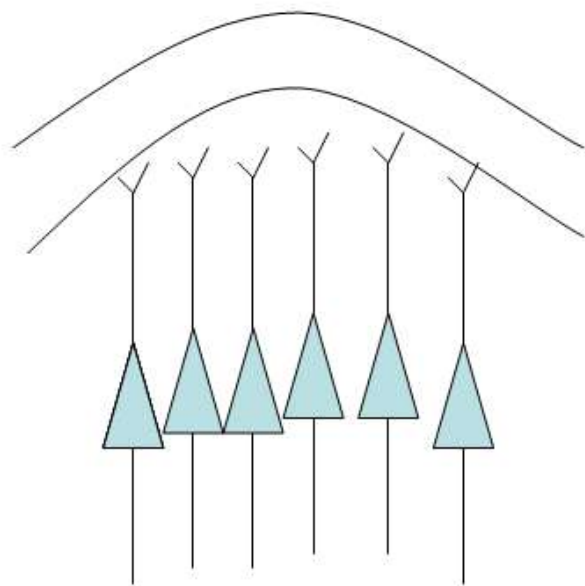
- Summation of inhibitory postsynaptic potentials (IPSPs) and excitatory postsynaptic potentials (EPSPs) from pyramidal neurons
- More than 100,000 neurons

Recording EEG

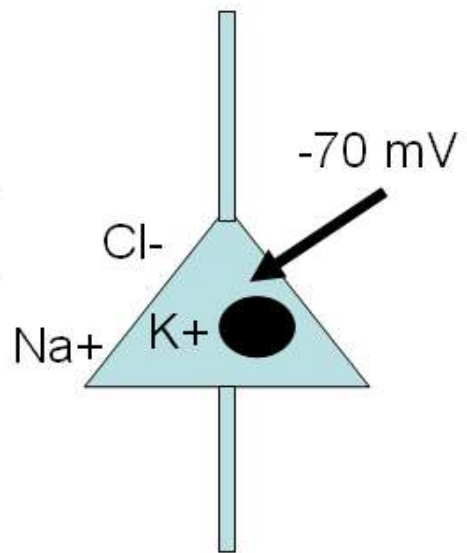




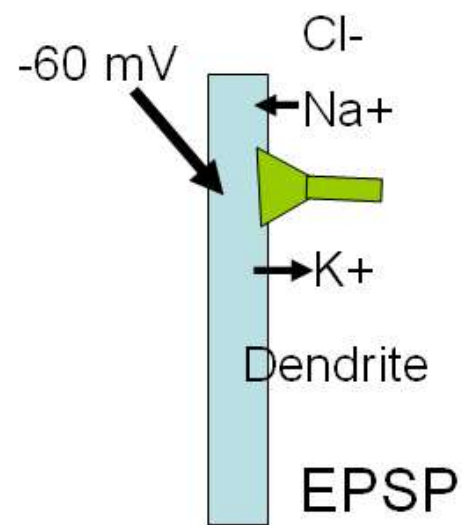
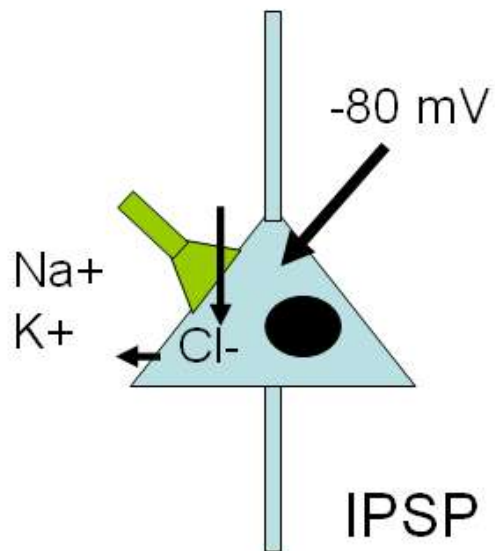
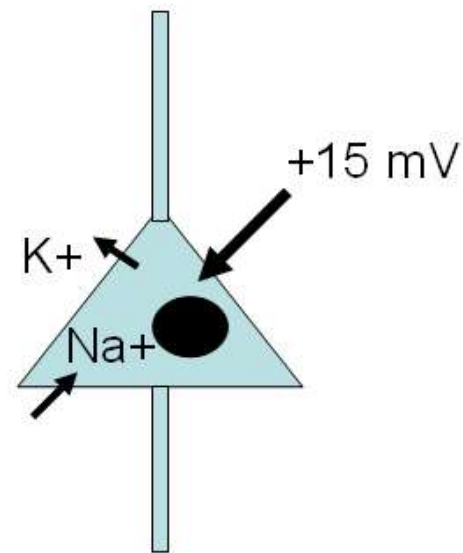




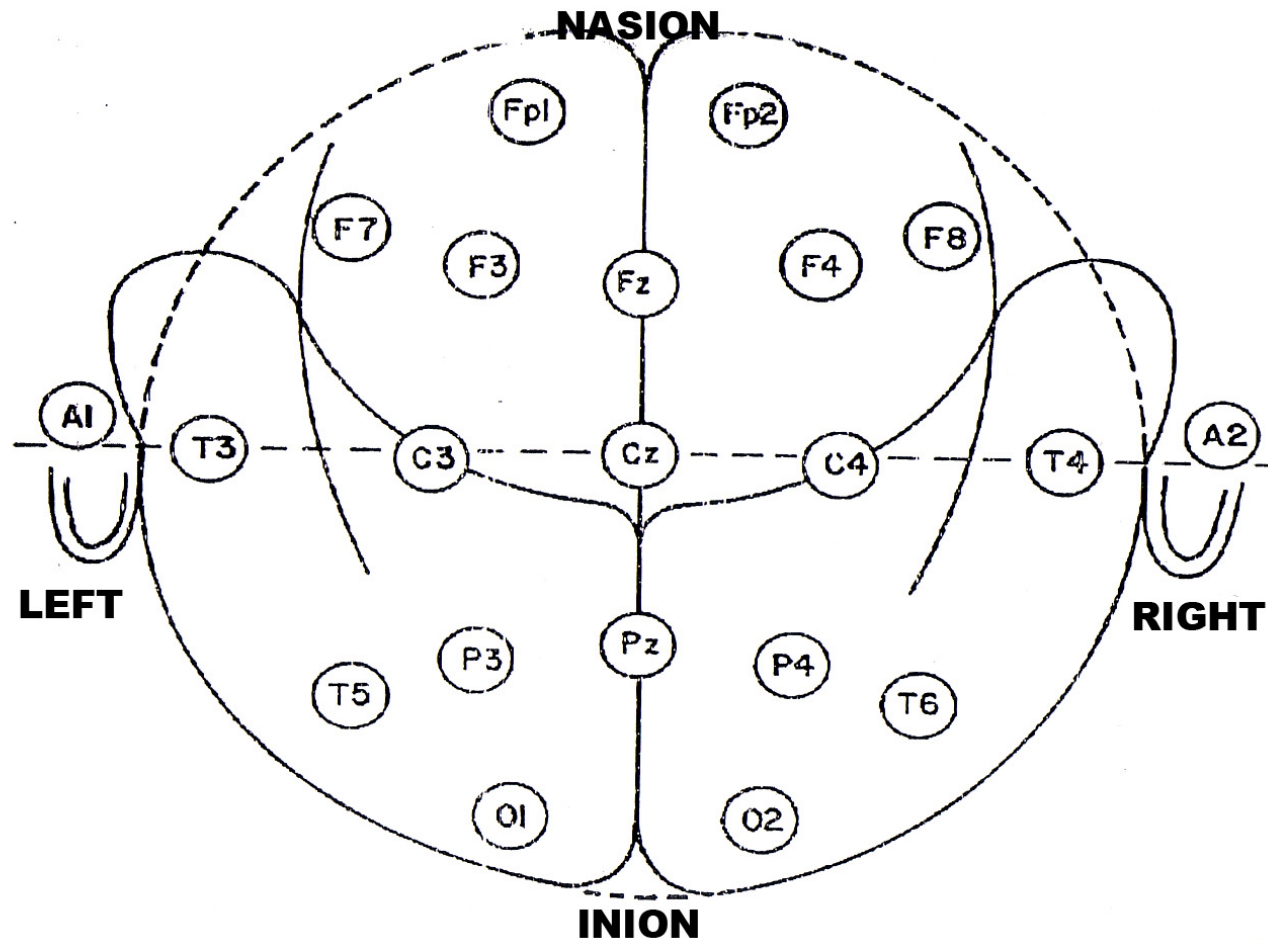
Resting potential



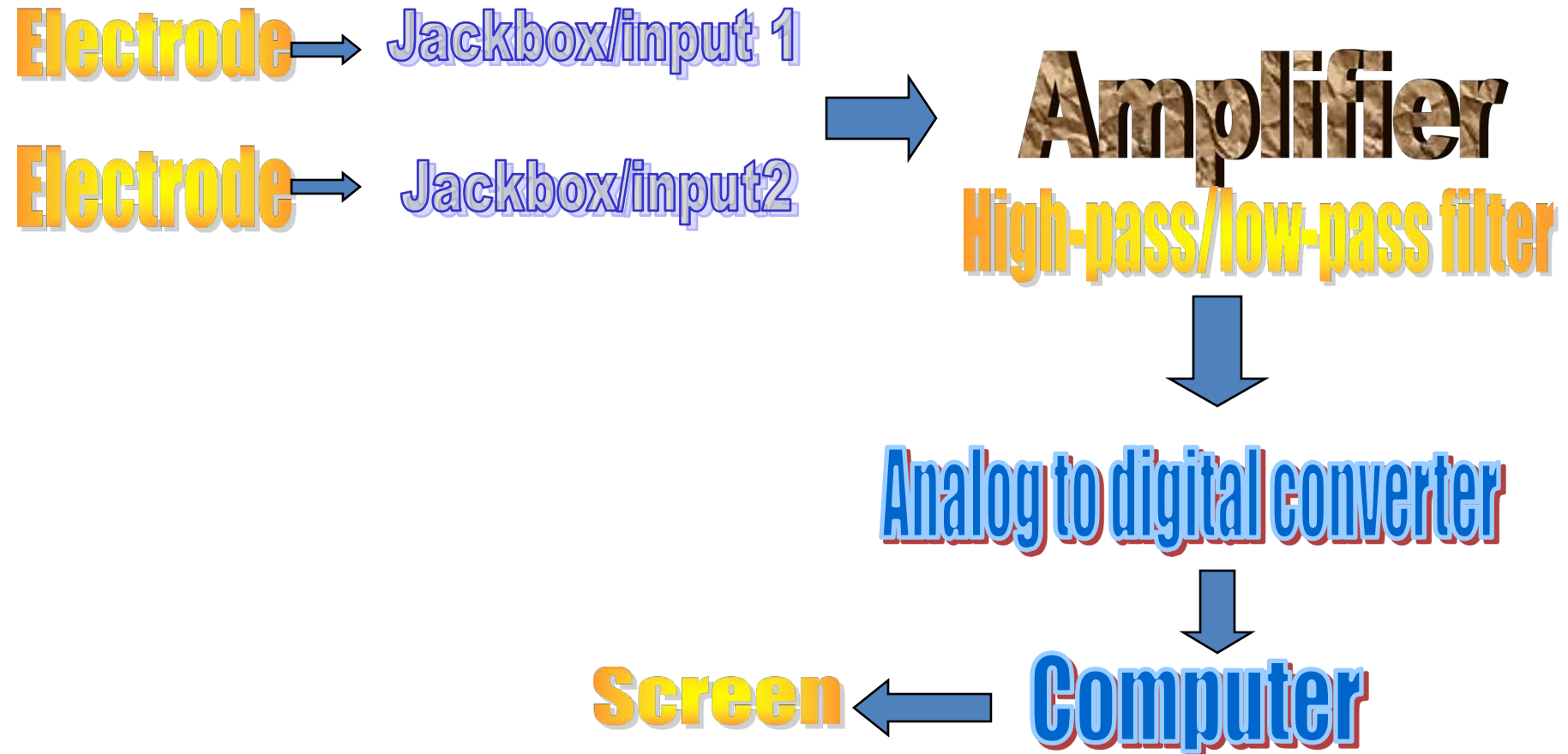
Action potential



Recording EEG

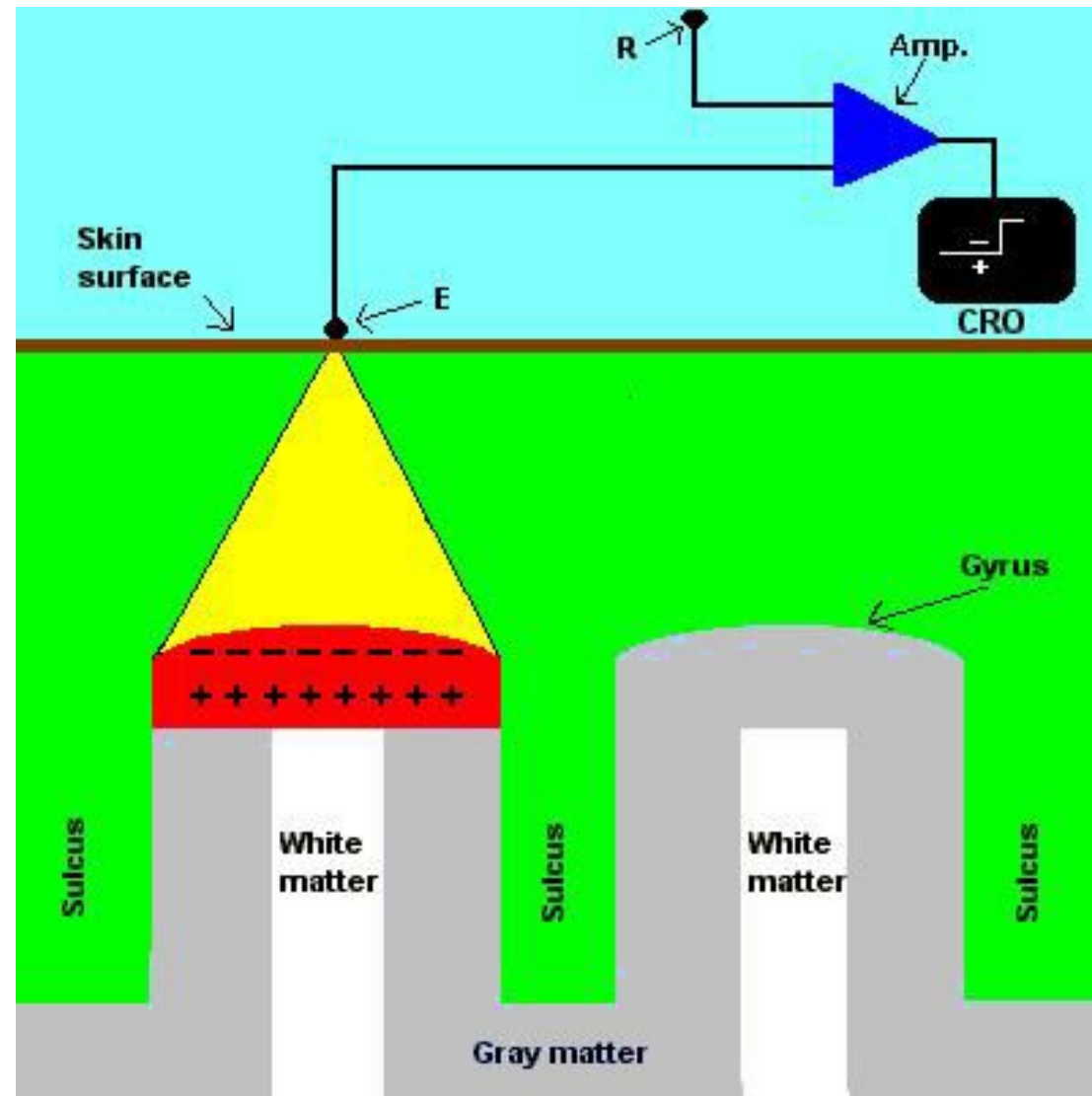


EEG machine



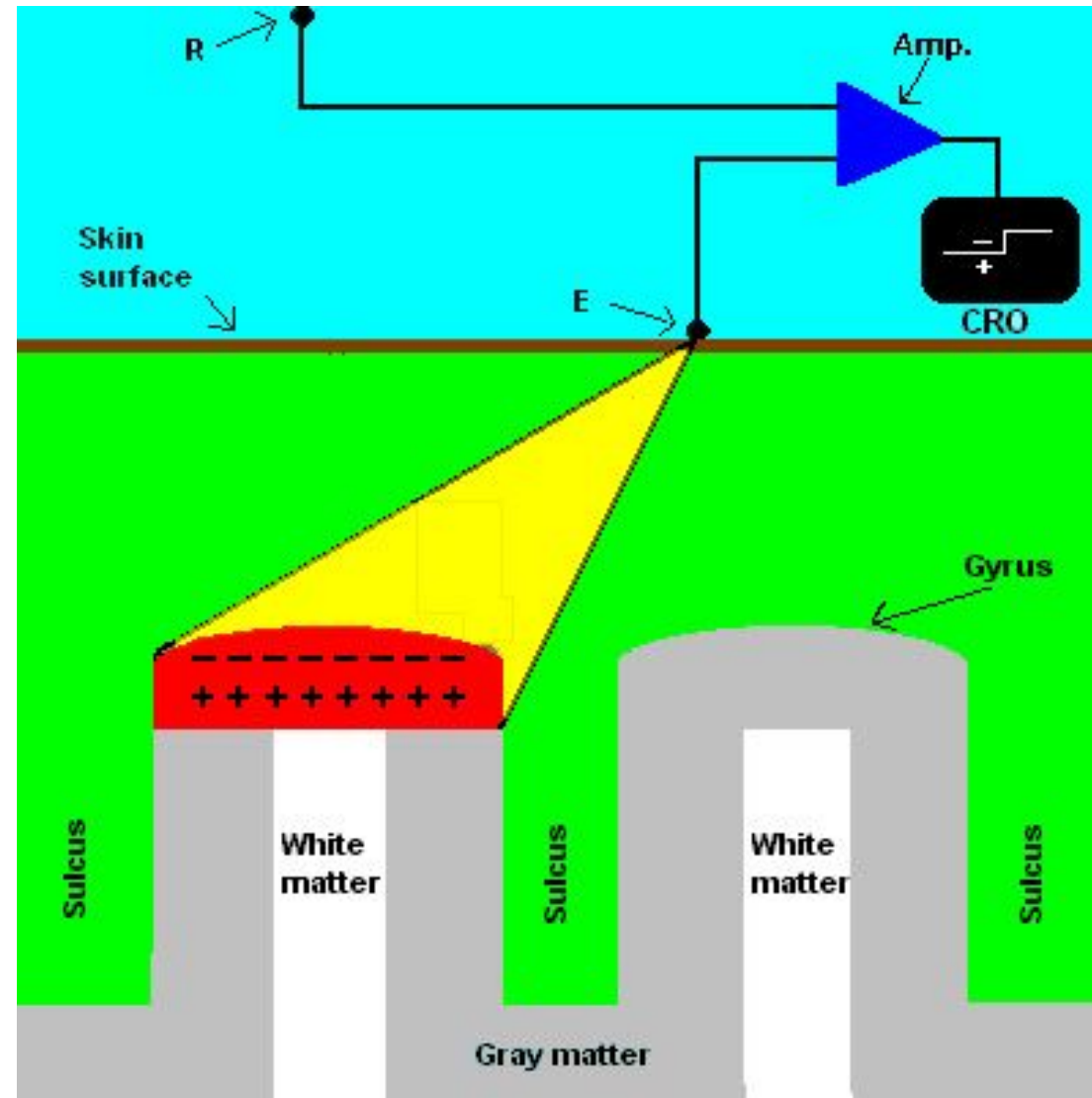
EPSP causes depolarization in pyramidal cell of the cerebral cortex gyrus

Electrode (E) located directly over the active dipole layer \rightarrow negativity



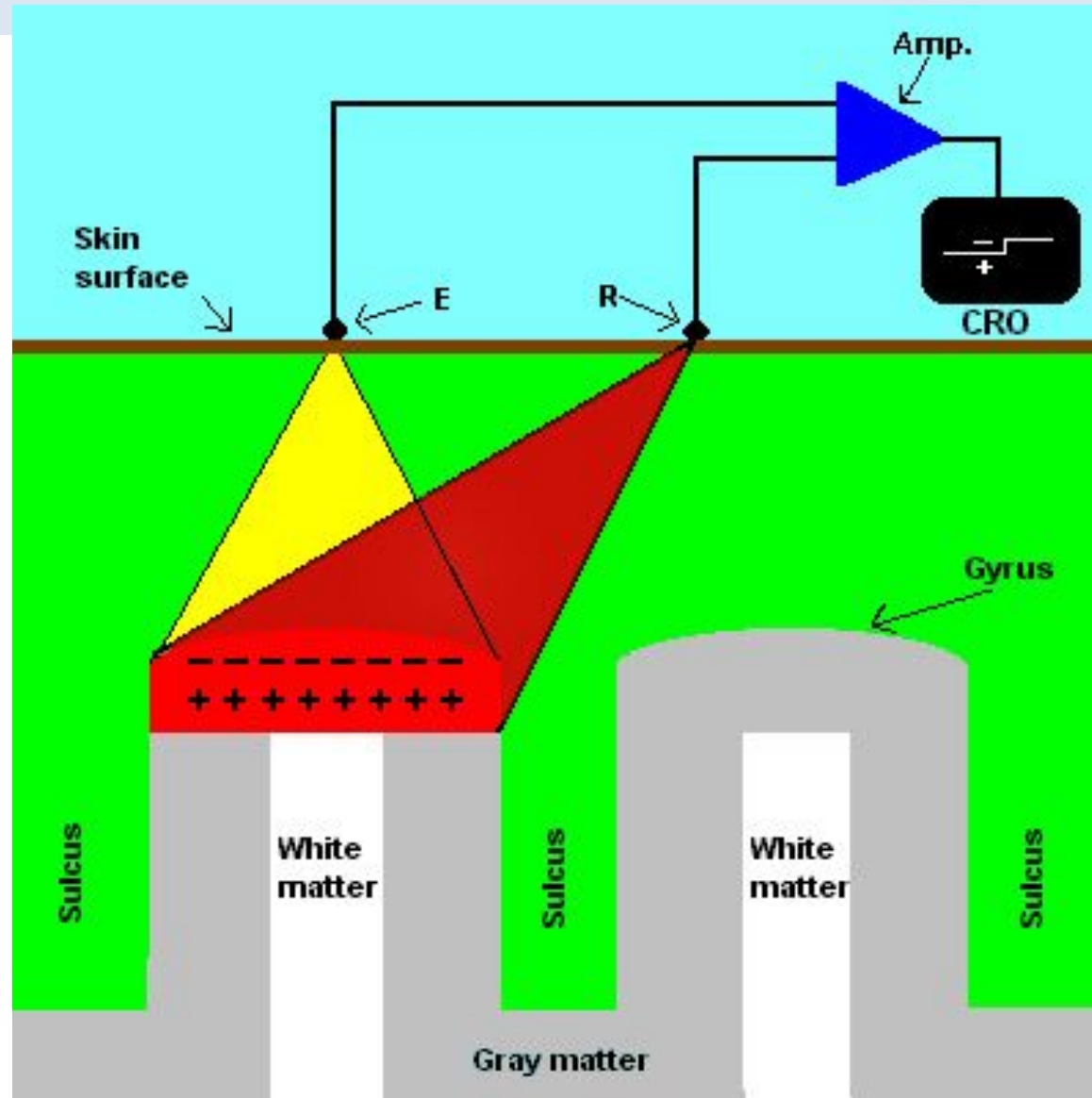
E further away from dipole layer, it sees the dipole layer at an angle

So the deflection of tracing is smaller, it is still negative



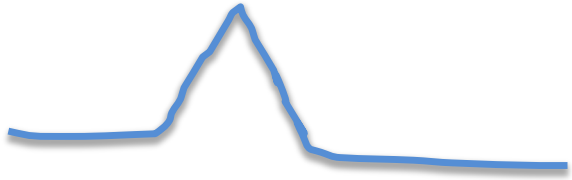
Example of bipolar montage: both electrodes are influenced by the event

Net result = E more negative than R

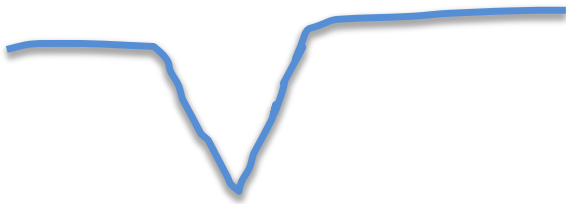


Output from amplifier

- Difference between input 1 and input 2
- If input 1 is more negative than input 2, the pen will deflect up



- If input 1 is more positive than input 2, the pen will deflect down



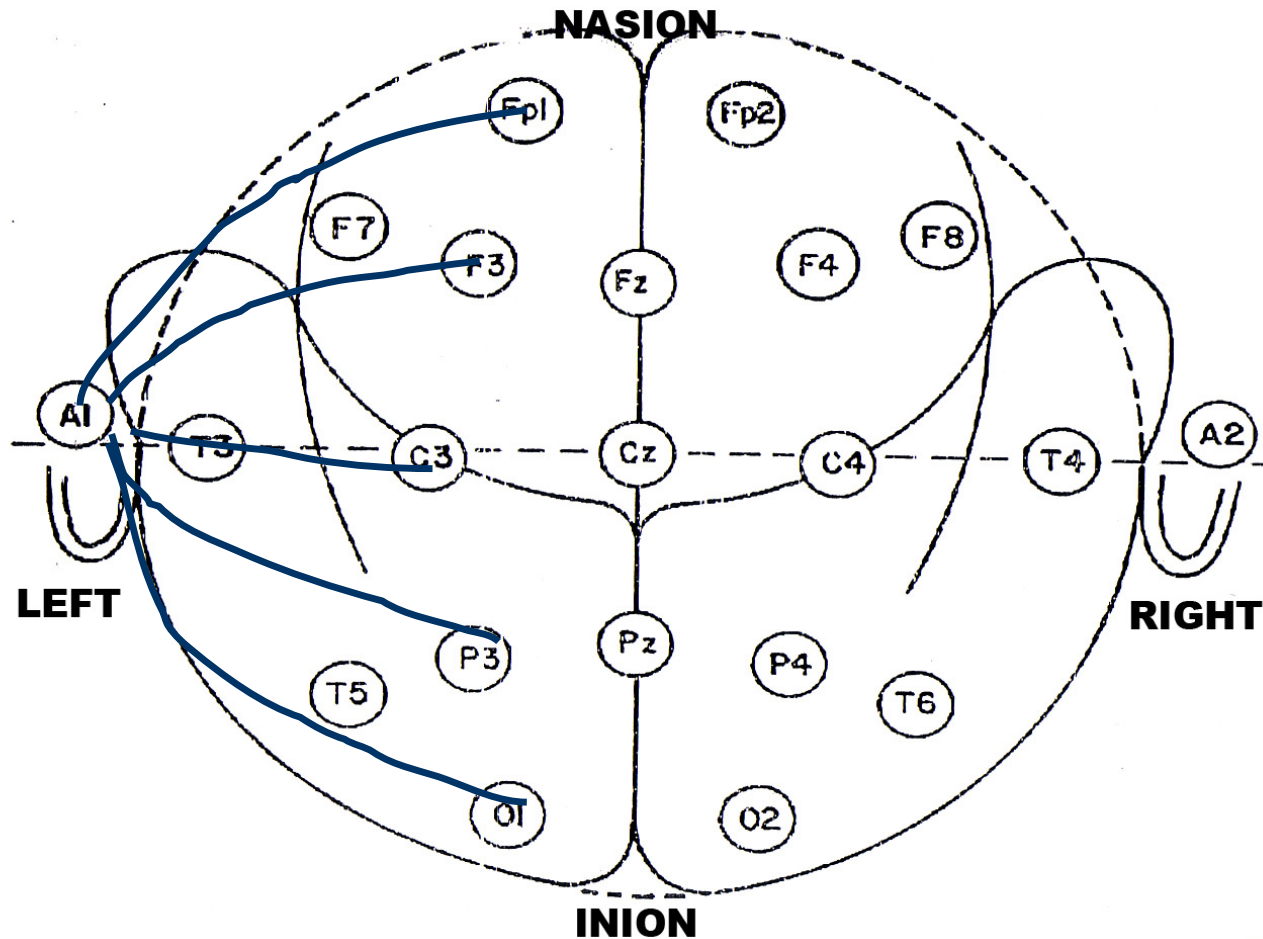
Montage

- Referential montages
- Differential montages

Referential montages

- Common reference electrode connected to input2
- Reference electrode need to be carefully chosen

Referential montages

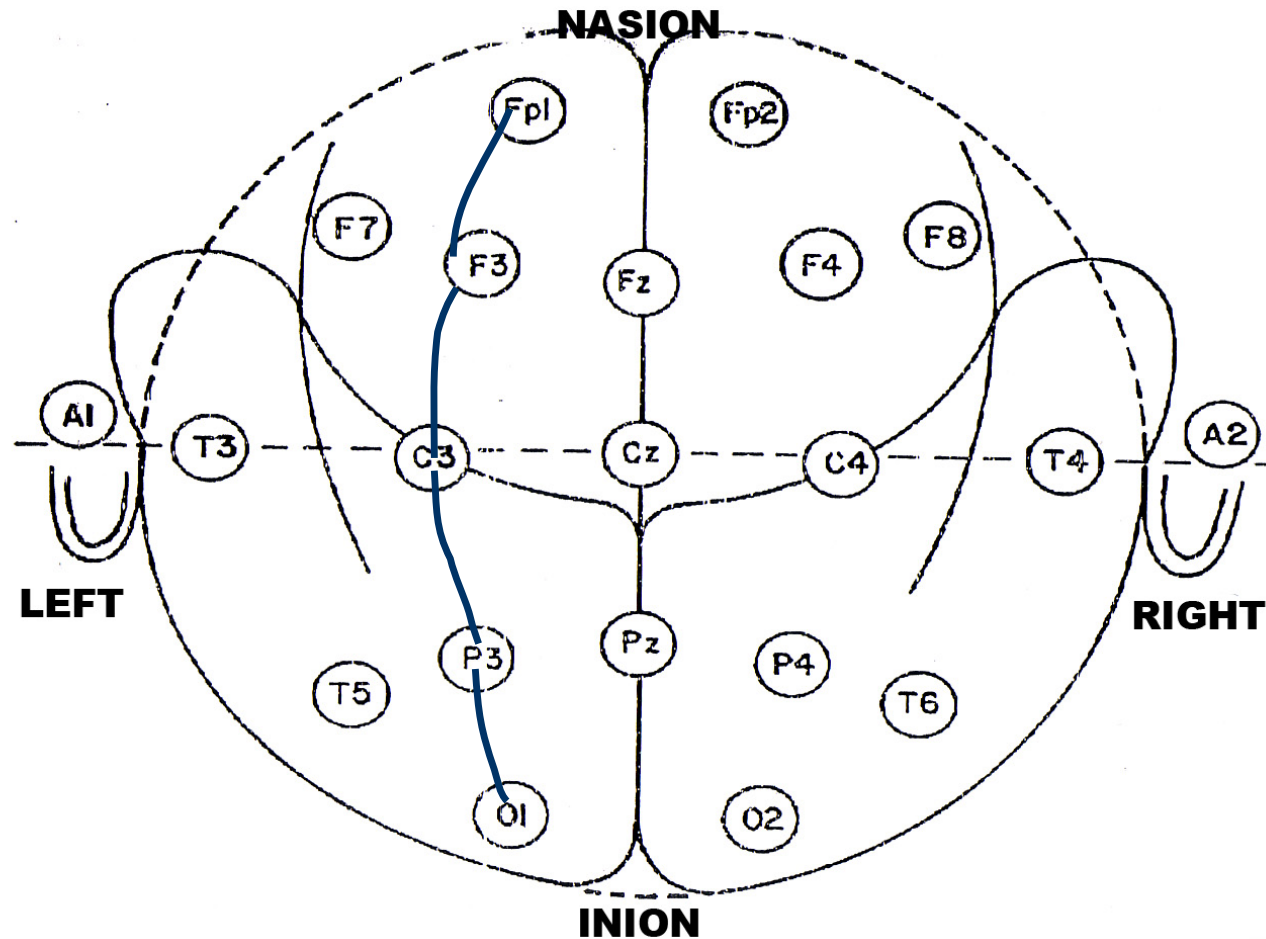


Fp1-A1
F3 -A1
C3 -A1
P3 -A1
O1 -A1

Bipolar montages

- Input 1 and 2 both connect to active electrodes
- Links serial pairs of electrodes in straight longitudinal or coronal lines

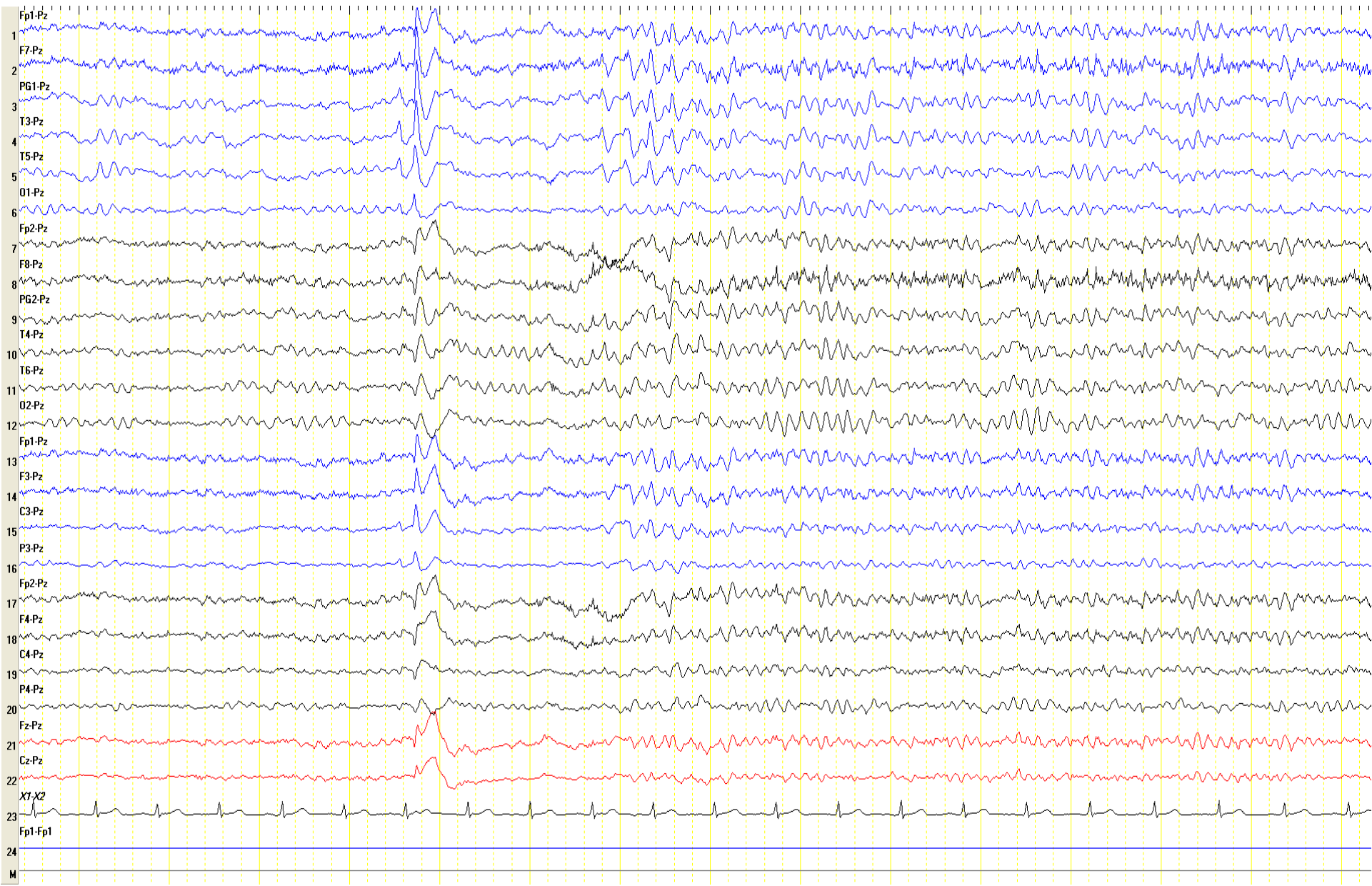
Bipolar montages

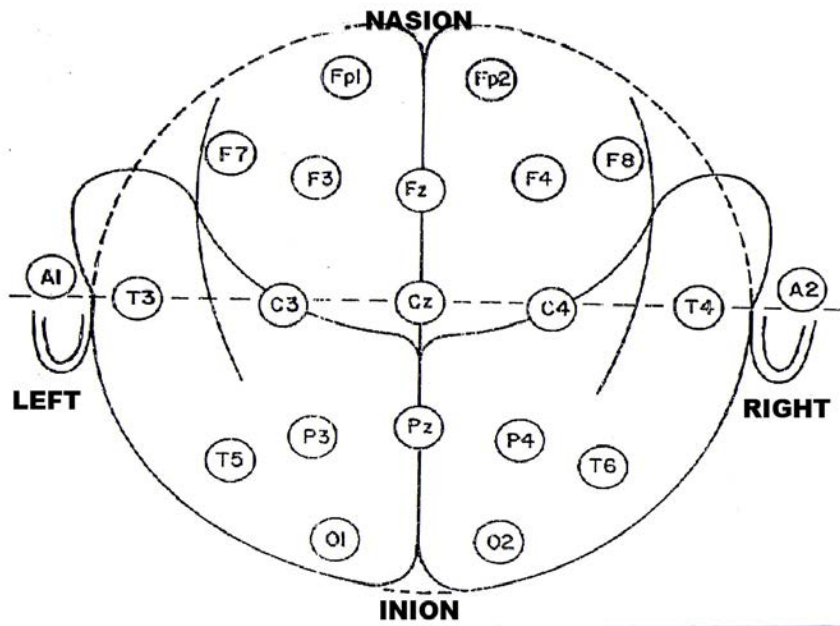


Fp1-F3
F3 -C3
C3 -P3
P3 -O1

What are on EEG records?

- Normal physiologic rhythm
- Abnormal physiologic rhythm
- Artifact: Physiologic artifacts, nonphysiologic artifacts

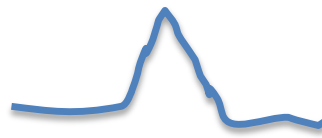




Fp1-A1



F3-A1



C3-A1

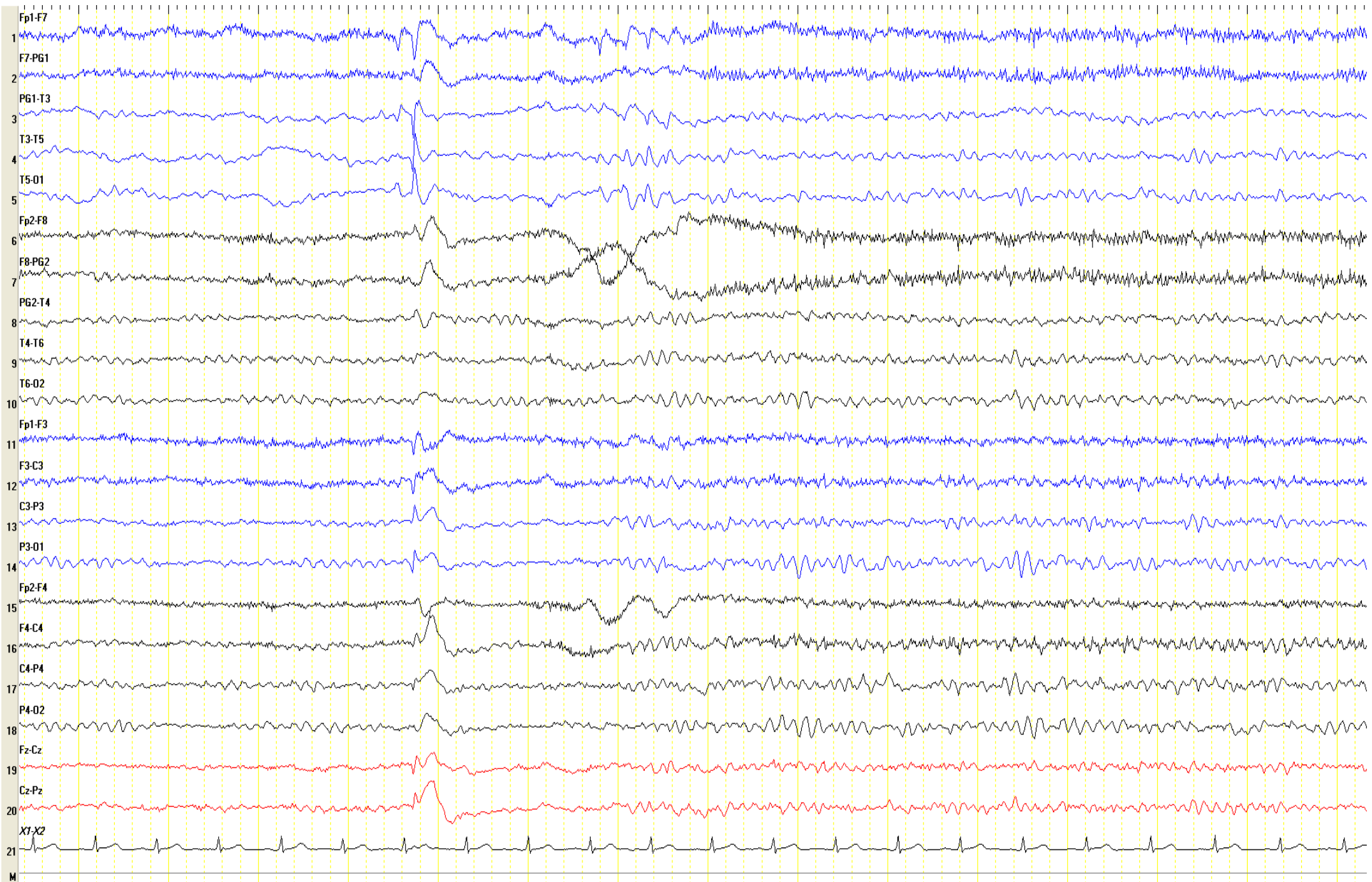


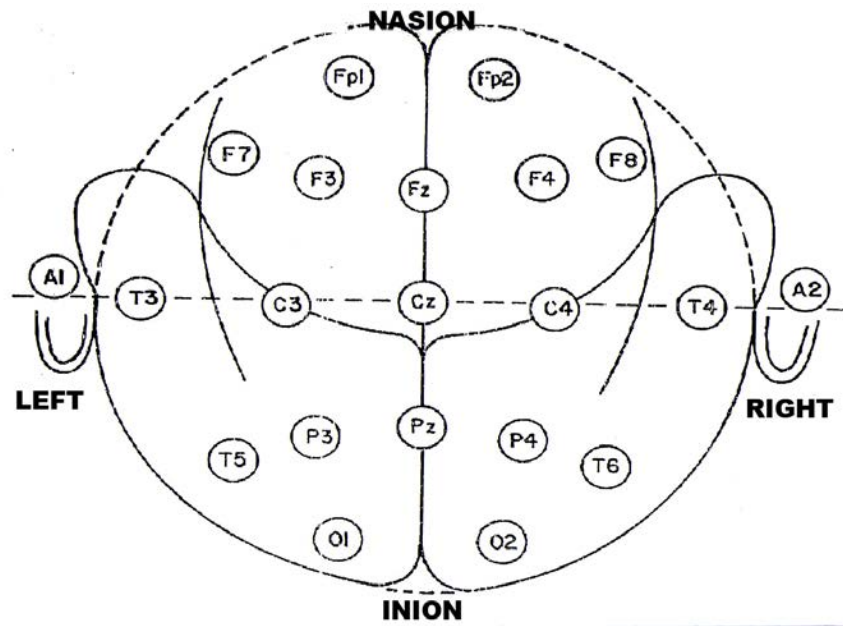
P3-A1



O1-A1







Negative

Positive

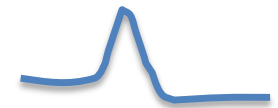
Fp1-F3



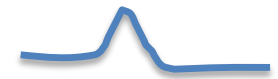
F3-C3

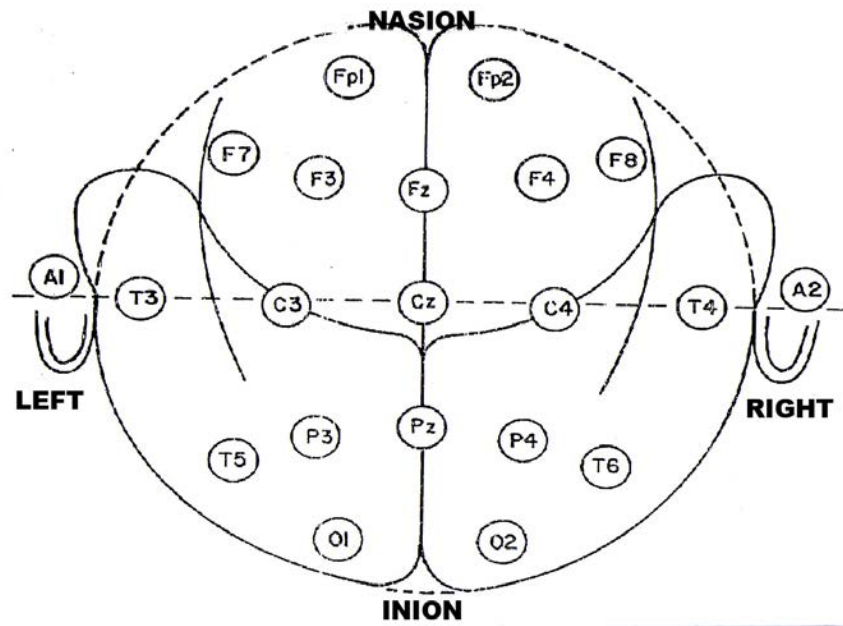


C3-P3



P3-O1





Negative

Positive

Fp1-F3



F3-C3

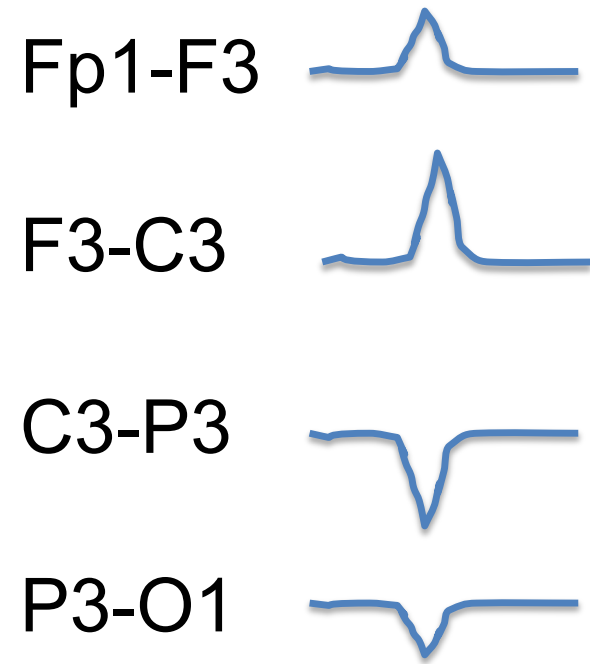
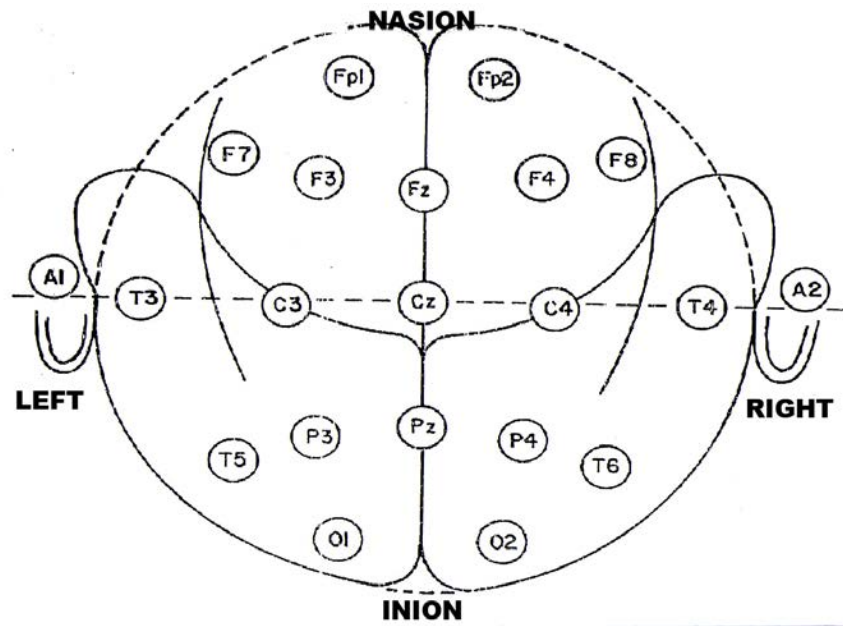


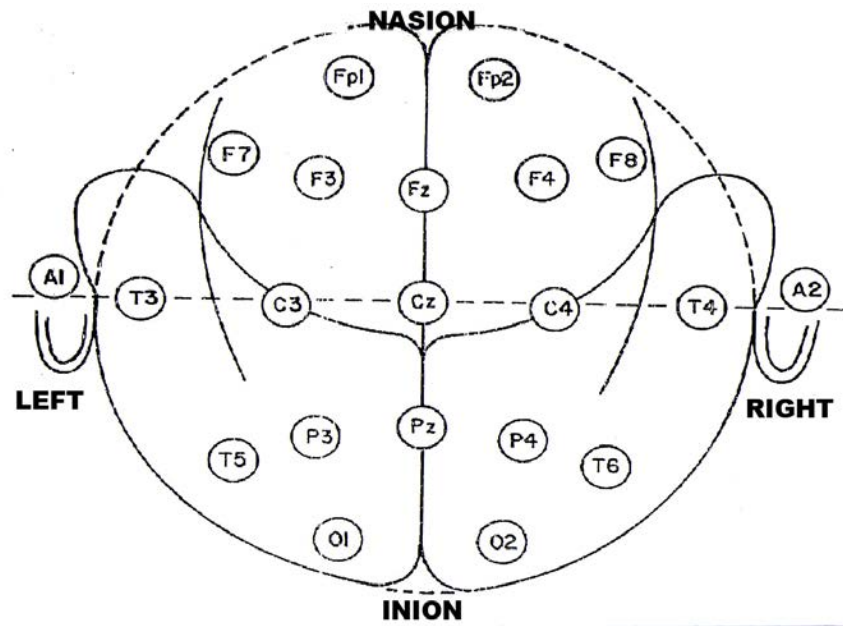
C3-P3



P3-O1



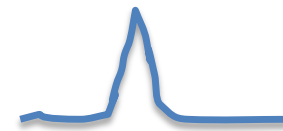




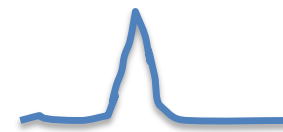
Fp1-F3



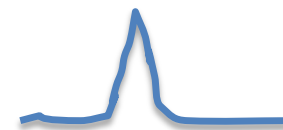
F3-C3

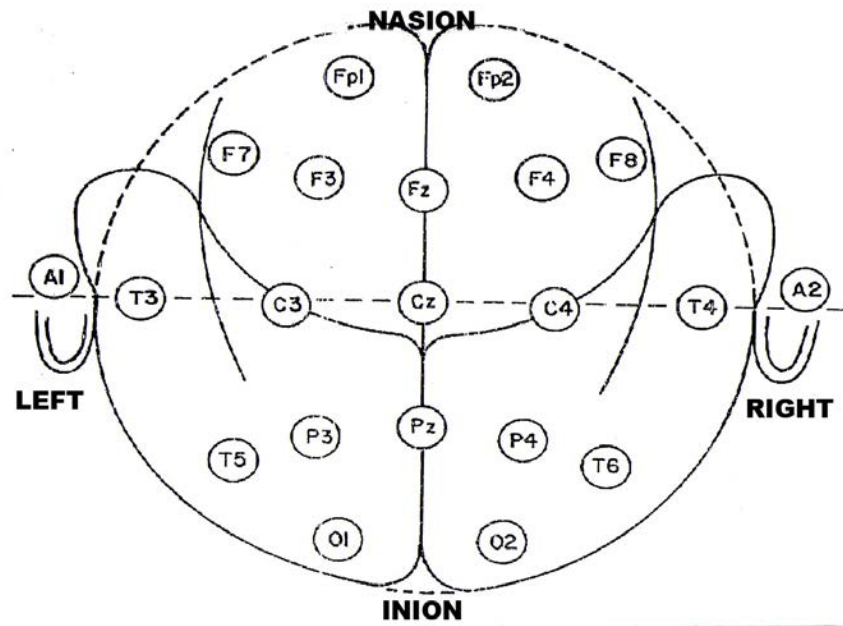


C3-P3



P3-O1

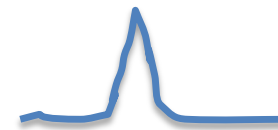




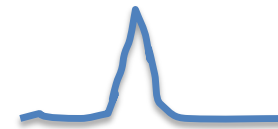
Fp1-F3



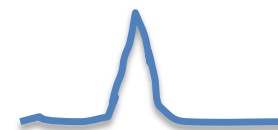
F3-C3

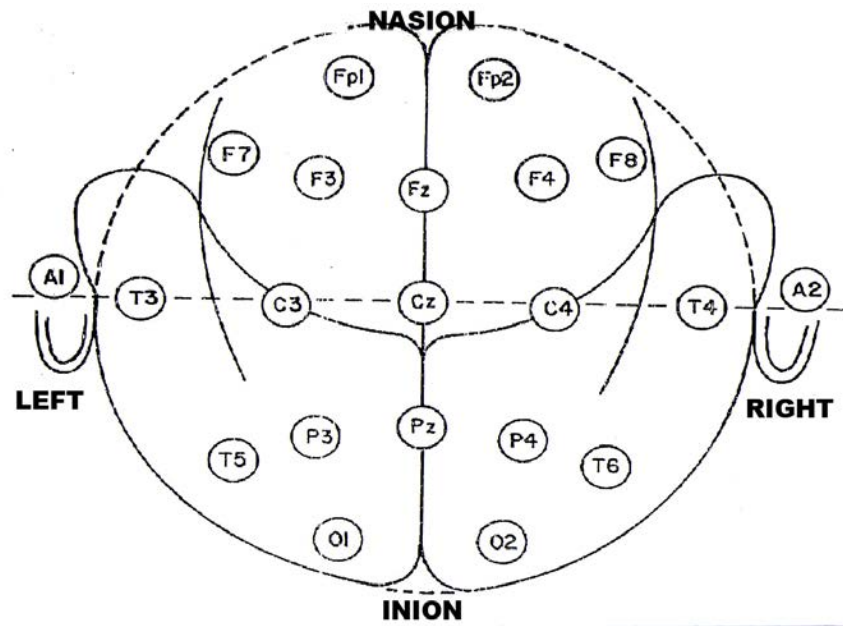


C3-P3



P3-O1

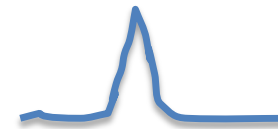




Fp1-F3



F3-C3

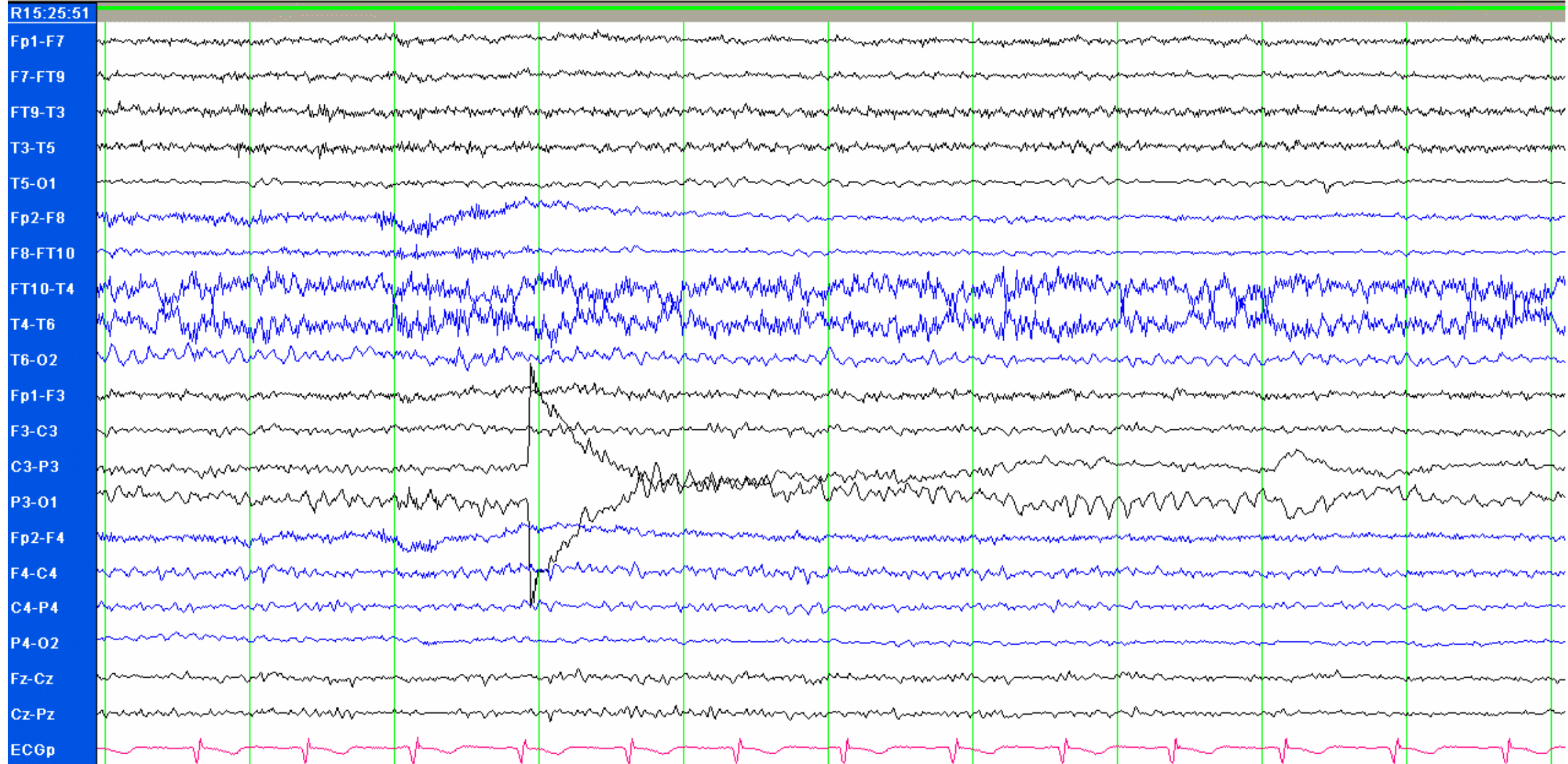


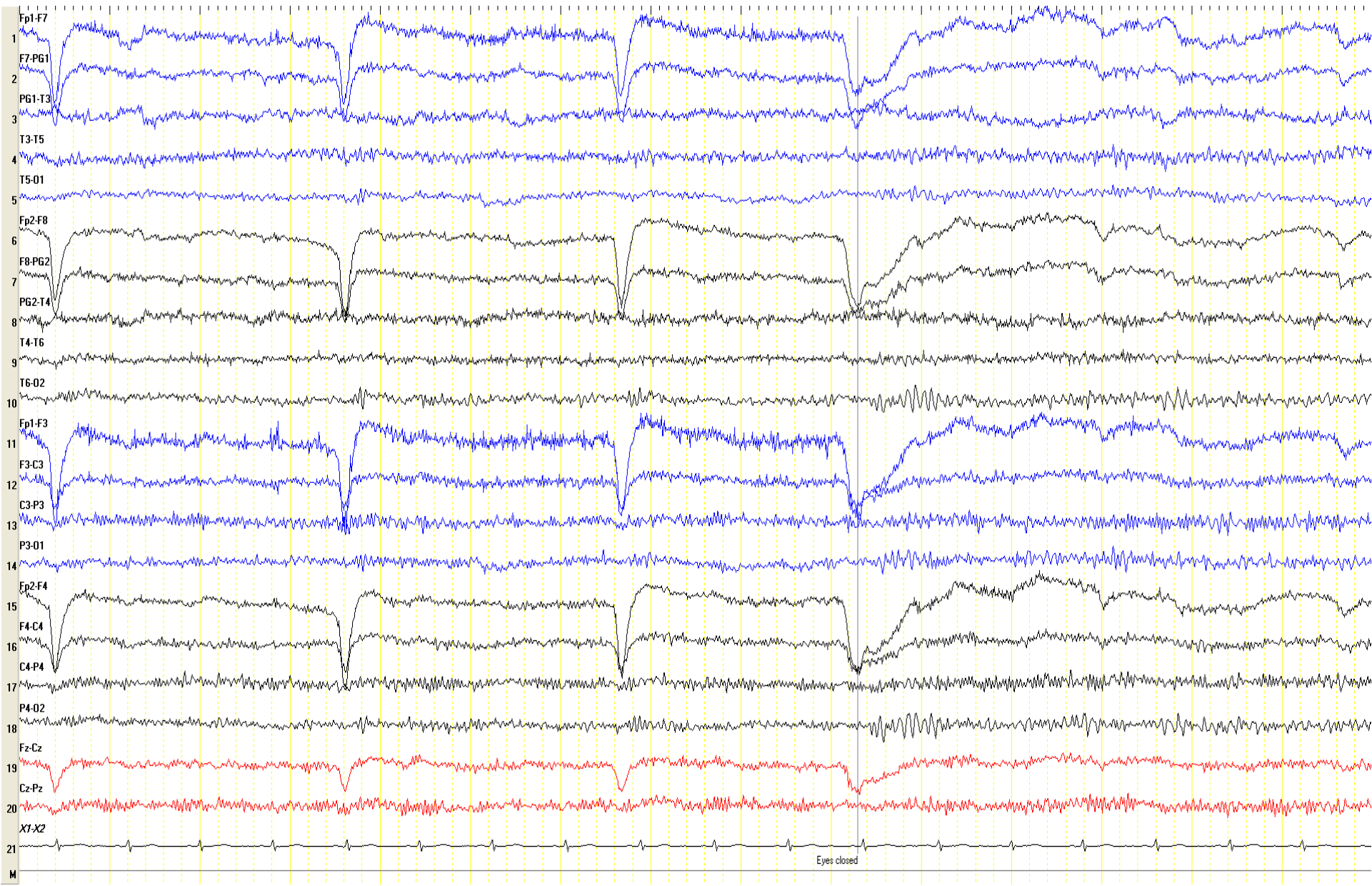
C3-P3

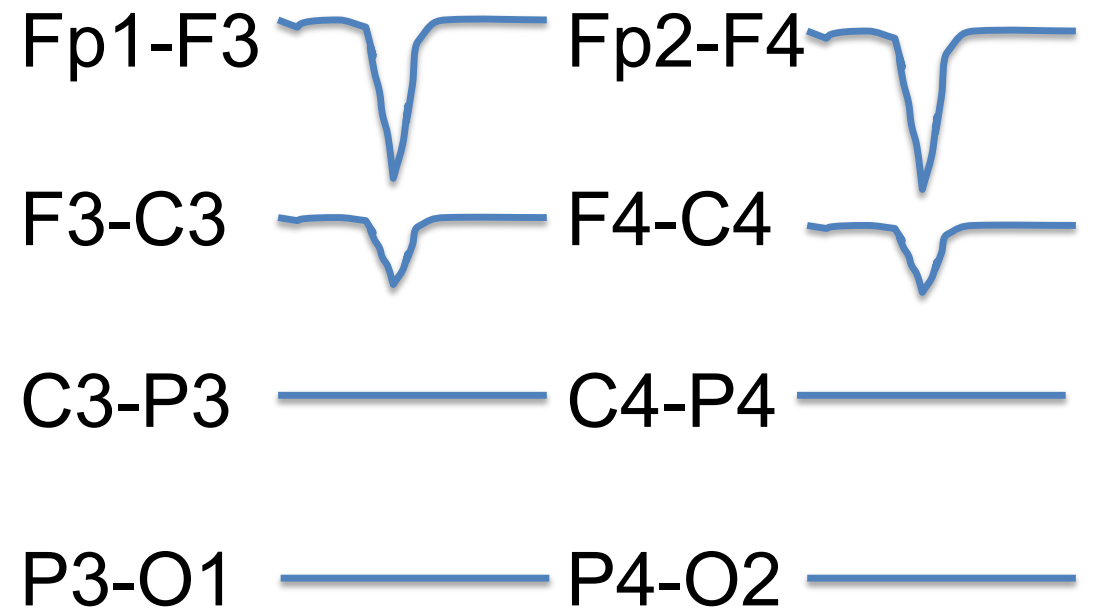
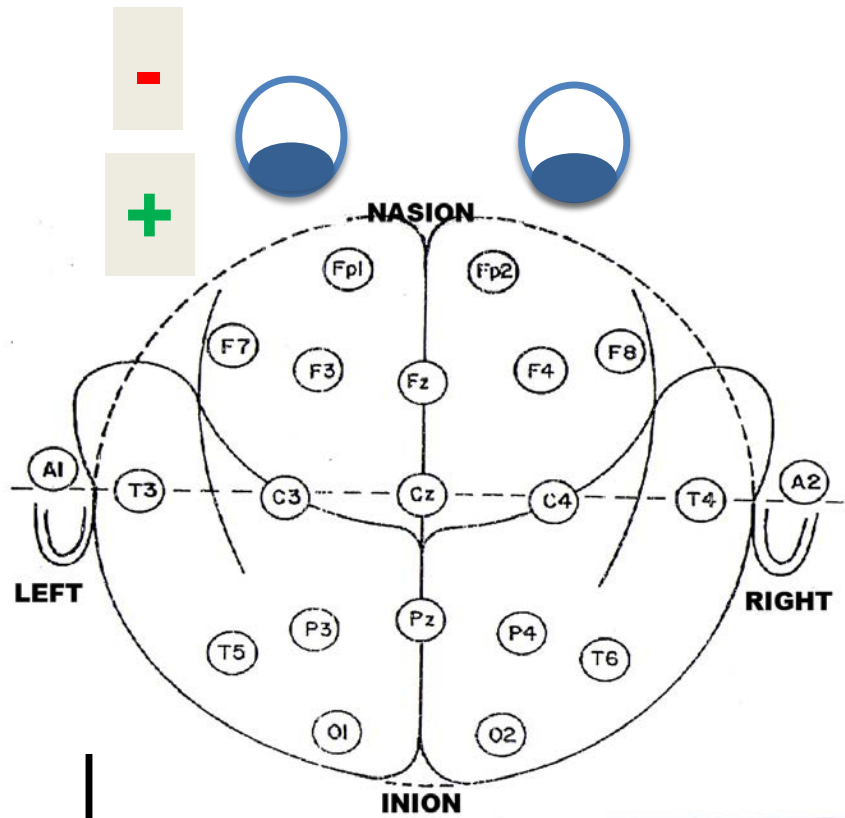


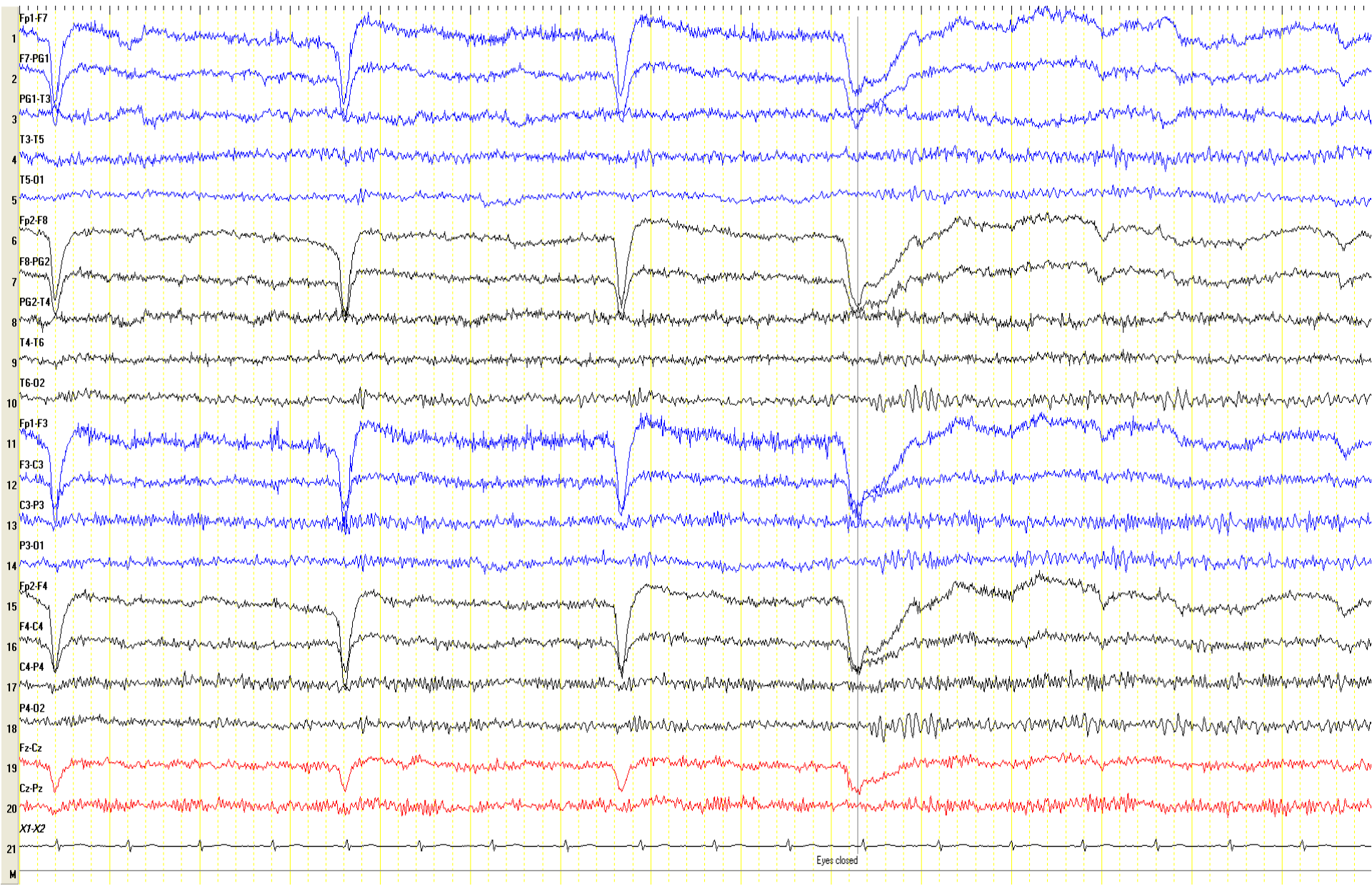
P3-O1

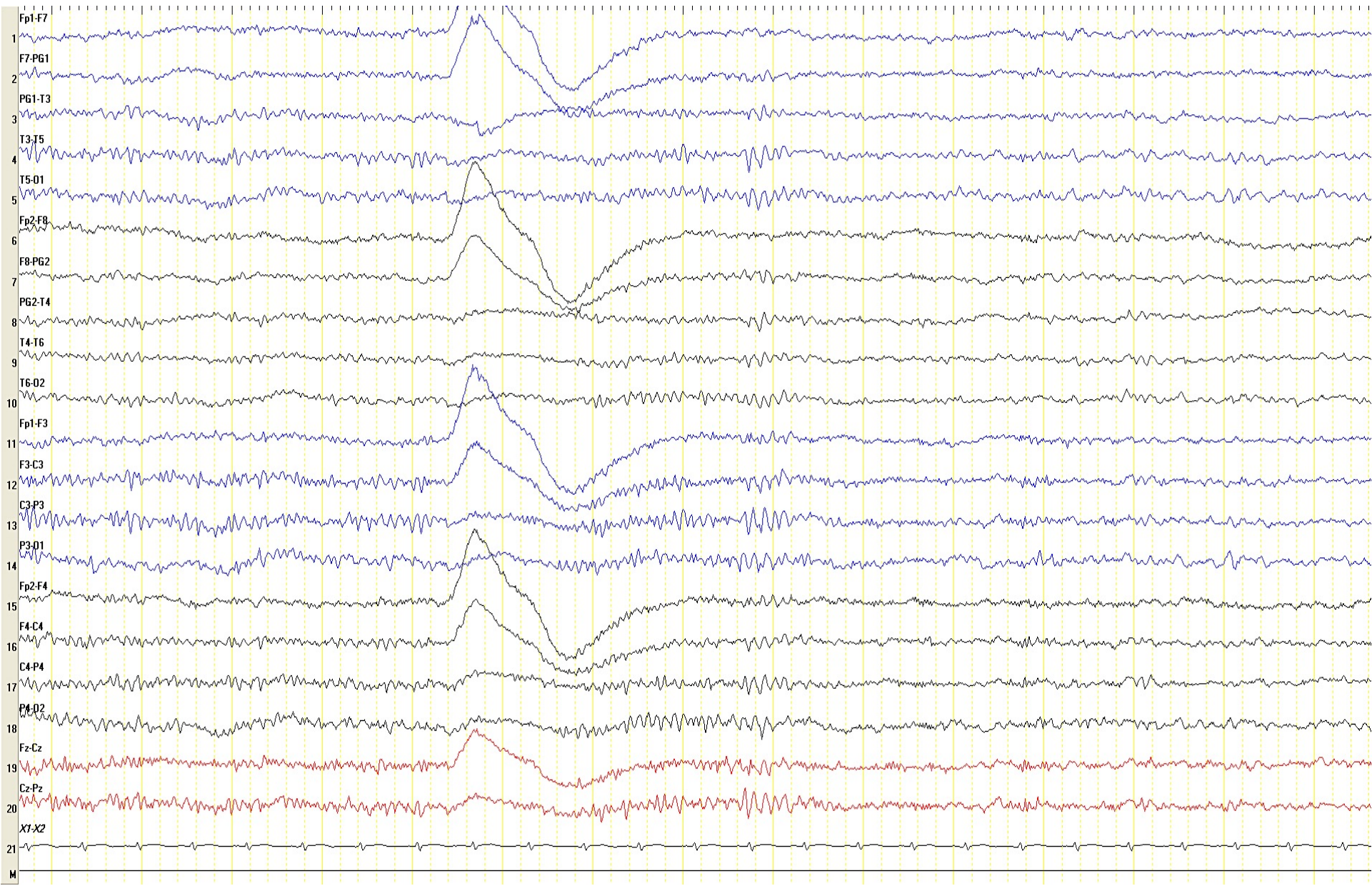


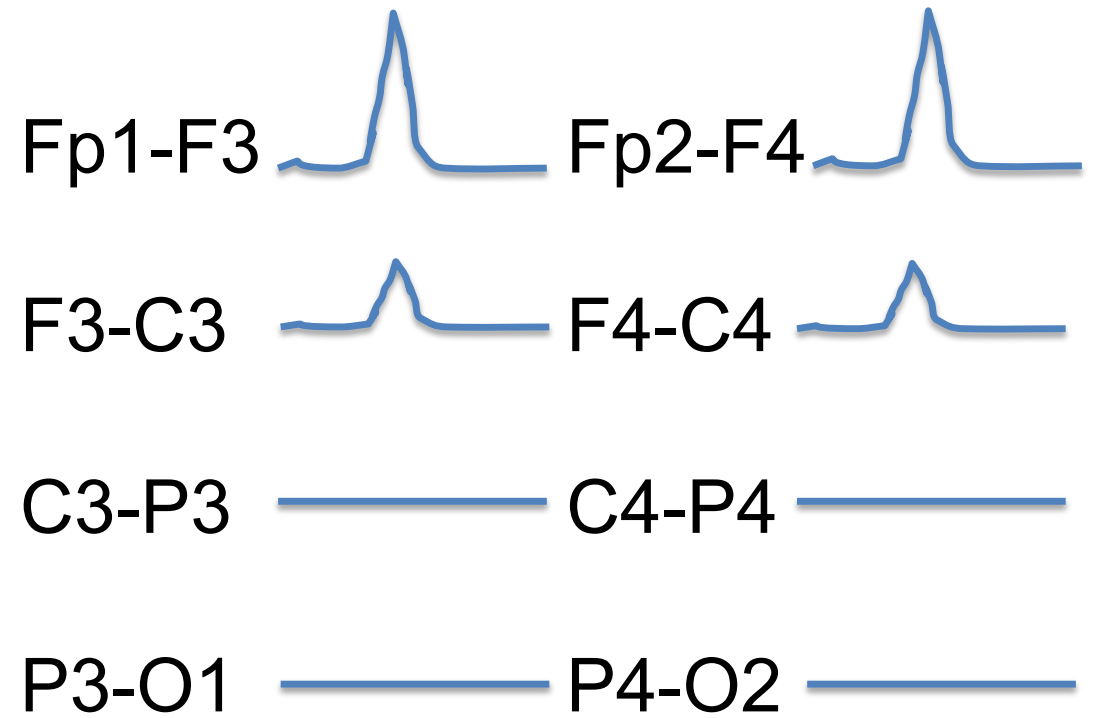
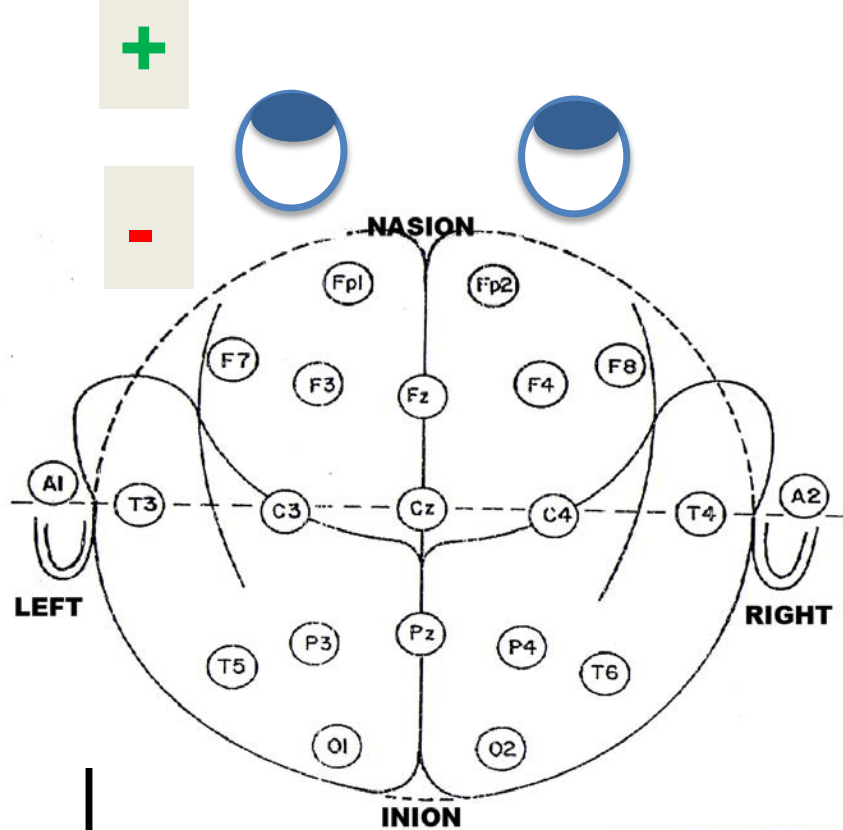


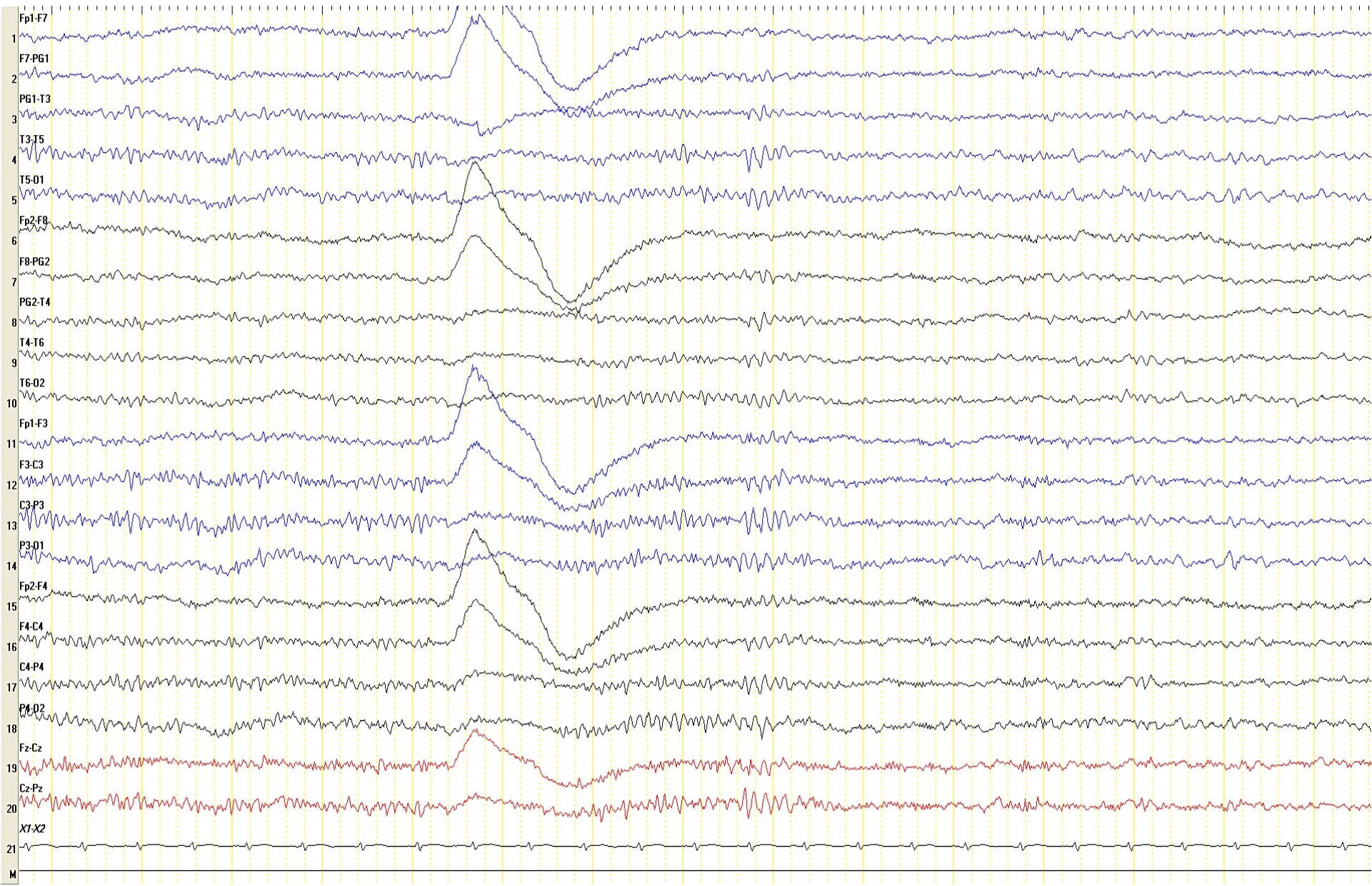


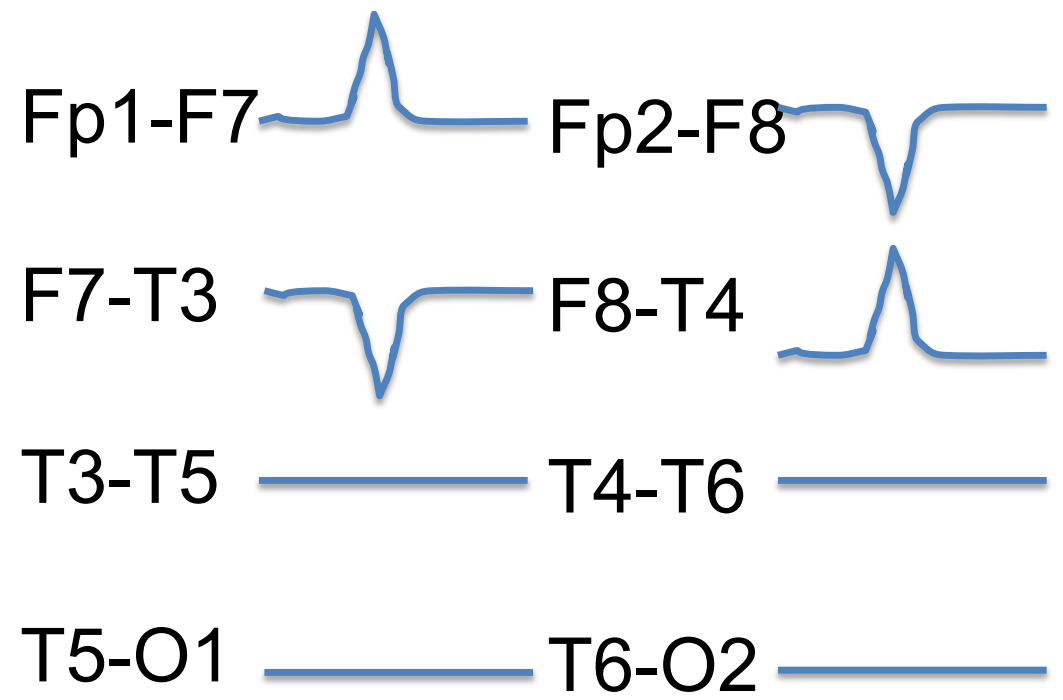
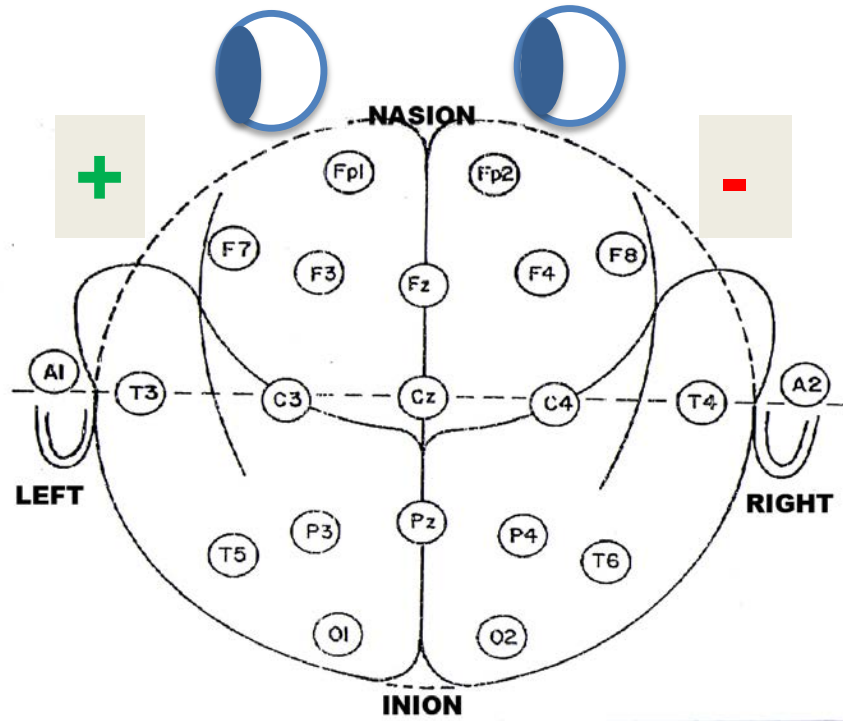


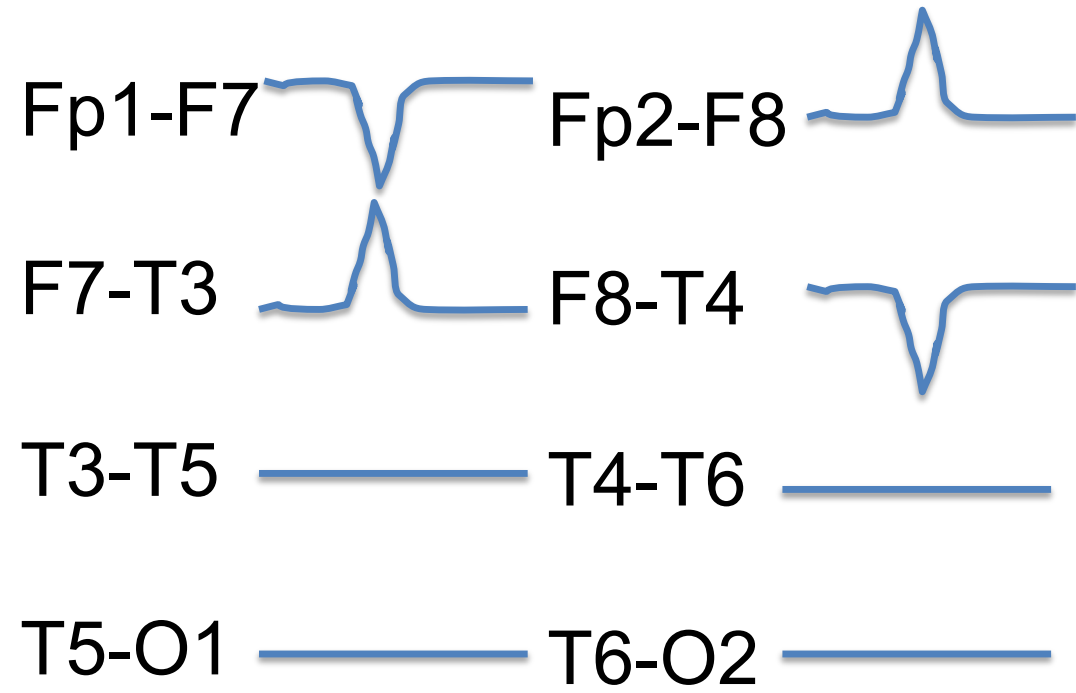
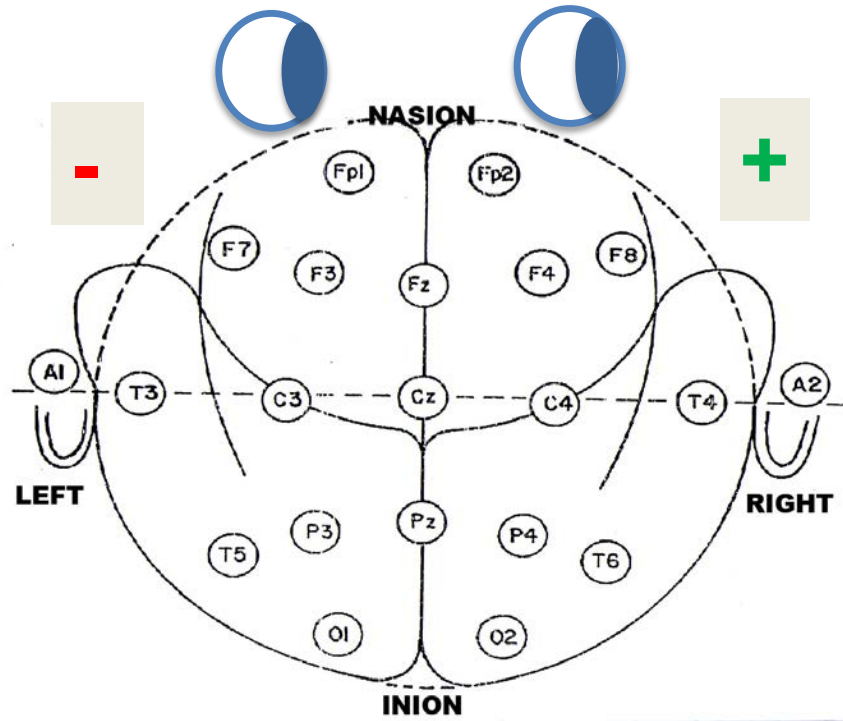


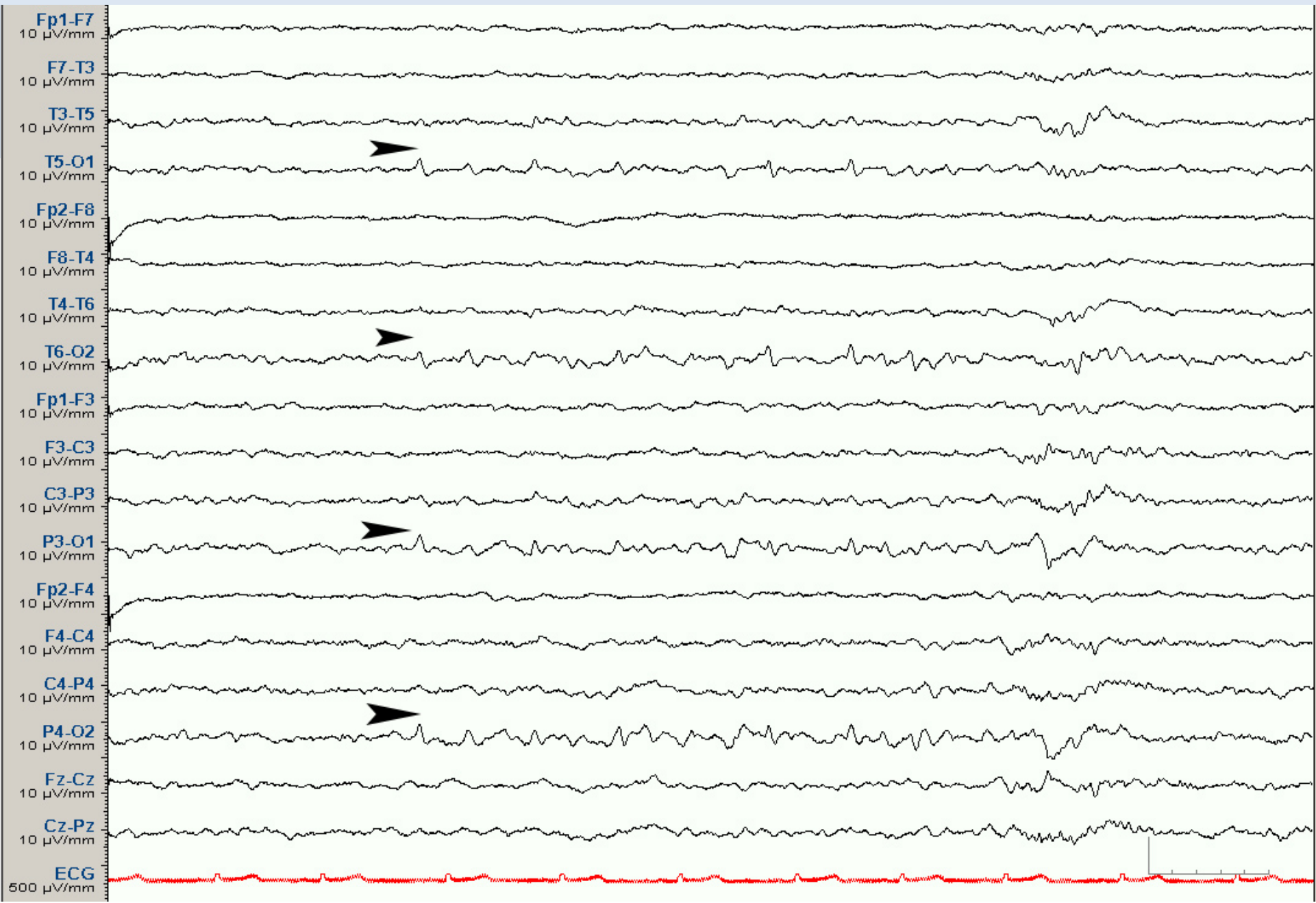


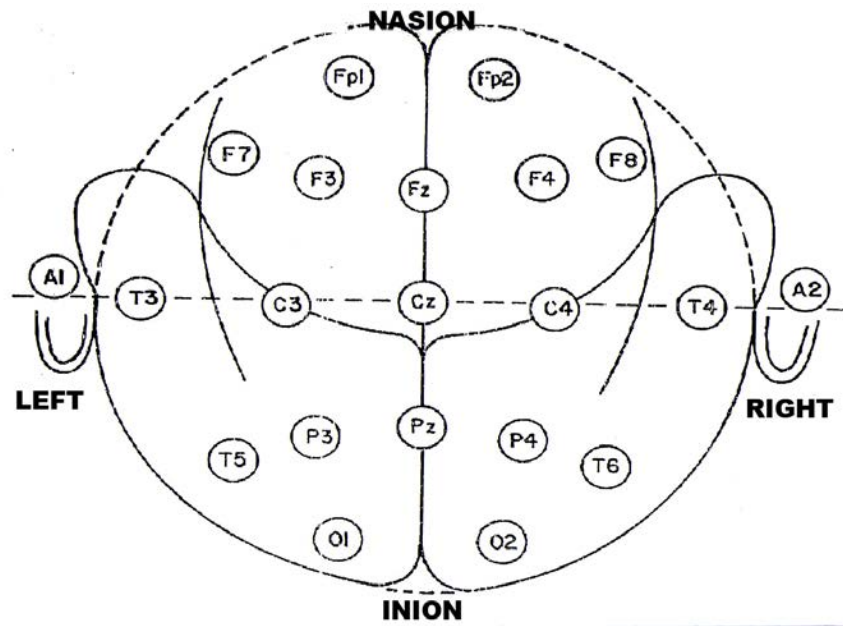












Fp1-F3



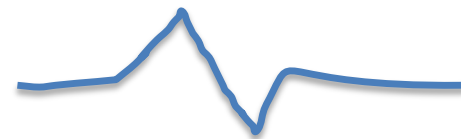
F3-C3

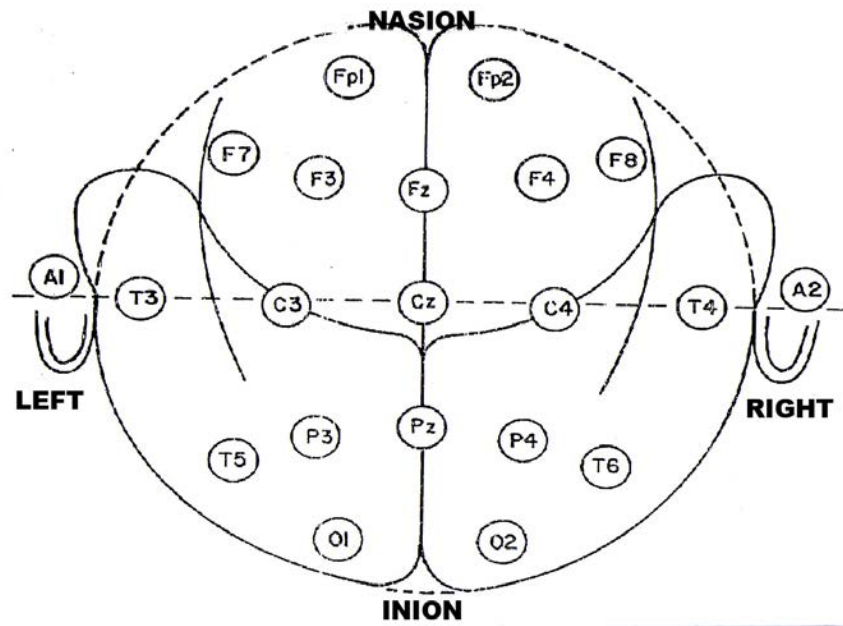


C3-P3



P3-O1





Fp1-F3



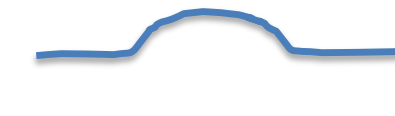
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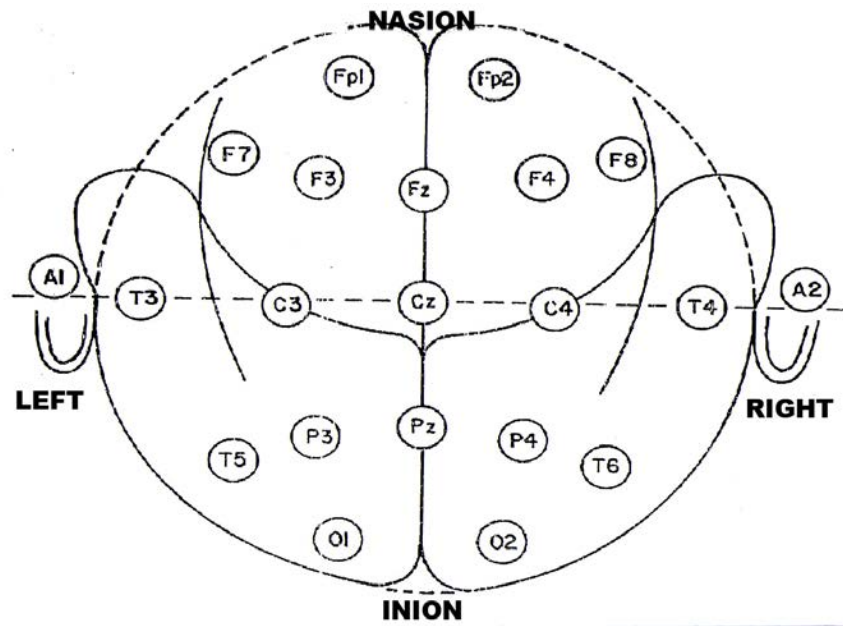


C3-P3



P3-O1





Fp1-F3



F3-C3



C3-P3



P3-O1



