a) i) Daniell Cell.

ii) Iron = anode = oxidation. It is the reductant. The flow of electrons move from this negative terminal to the positive terminal.

~~$Fe^{2+} \rightleftarrows Fe_{(s)}$~~

Copper = cathode = reduction. It is the oxidant. The flow of electrons move towards this positive terminal.

$Fe_{(s)} \rightleftarrows Fe^{2+} + 2e^-$: $0.44\,V$ +

$Cu^{2+} + 2e^- \rightarrow Cu_{(s)}$: $-0.34\,V$

$= \underline{0.10V} = E^\ominus_{cell}$

b) Galvani - Experimented with frog's legs to produce an electric current. (no electrostatic charge). Although his theory concerning animal electricity was disproved, his study provided the framework for

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electrophysiology and the biological aspects of electricity.

Davy - Discovered that alkalis had an electric charge and also discovered important ~~ea~~ elements (Cu) etc. ~~Co~~ constructed largest battery ever built & the "Davy Lamp".

Faraday ← (was also the ~~first~~ to isolate Benz-ne) Studied and expanded on the field of electromagnetism and provided his first law of electrolysis which stated that:-

"The quantity of a substance that is deposited, evolved or placed at an electrode during electrolysis is directly proportional to the electrical current flowing through the circuit."

c) i) decrystallisation.

ii) Wood - undergoes about 10 months of mechanical cleaning while it

is still kept moist in order to avoid a crystallisation of the wood, where the water and salt particles separate and the salt crystallises disrupting the wood's cellulose fibres. After the cleaning process, the wood is coated with resin and other lacquers.

d) i) six test-tubes were set up and six nails were placed in each, along with the salt water solutions and a "protective" layer existed on each nail to attempt to protect it from the presence of rust appearing on the nail, eg: oil, salt solution, plain water, etc. these nails were then left in open test-tubes for 6 weeks. The results were indicative.

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ii) Acidic environments do increase the rate of corrosion due to the presence of the H^+ ions reacting with the oxygen present at the surface of the water. The experiment supports this hypothesis.

c) It could be hypothesised that, at greater depths, the rate of corrosion would be less due to the lack of oxygen and the overall pressure of the great depths. Wrecks that remain at the surface react with the oxygen in air. Rusting is an electrochemical process :-

$$2Fe(OH)_{3(aq)} \rightarrow Fe_2O_3 \cdot x\ H_2O_{(s)} + (3-x)\ H_2O_{(l)}$$