The Aneurin Great War Project: Timeline
Part 8 - The War Machines, 1870-1894

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[BUT UNDER CONSTANT EXTENSION AND CORRECTION, SO CHECK AGAIN SOON]

This timeline supports the Aneurin series of interdisciplinary scientific reflections on why the Great War failed so singularly in its bid to be The War to End all Wars. It presents actual or best-guess historical event and introduces theoretical issues of cognitive science as they become relevant.

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The Timeline Items

1870 Charles A. Elliott [1850<=>d. 1877 (9th October)] retires from Elliott Brothers [1850<=>1876]. [THREAD = WW1 CYBERNETICS, COMPUTATIONAL SCIENCE, AND FIRE CONTROL] [THREAD = THE WW1 FINANCIAL AND ARMAMENTS INDUSTRIES]

1870 The Scottish-born Canadian John L. Johnston [Wikipedia biography=>1888] wins a contract from the French War Department to supply it with "fluid beef", a nutritious and hermetically sealed beef extract. [THREAD = WW1 LOGISTICS]
1870 The Smith and Wesson Company [<=1861] puts its six-shot .44” calibre Model 3 Revolver [image] on the market. Its 1875 "Schofield" variant is popular in both 5" and 7” barrel versions in the American West. [THREAD = WW1 SMALL ARMS]

1870 The University of Zurich sets up its own psychiatric clinic at the Burghölzli [modern homepage=>1898] with Bernard von Gudden [Wikipedia biography] as its first medical director. Around the same time the British neurologist Henry Maudsley [Wikipedia biography=>1907] presents a paper entitled "Body and Mind" [full text online] in which he reflects, amongst other things, on the origins of "certain forms of degeneracy of mind". His views still make interesting reading (and the issues he raises are still far from resolved) ...

"But it is only in a small proportion of cases of insanity that we can discover such a direct physical occasion of disease. In a great many cases - in more than half, certainly, and perhaps in five out of six - there is something in the nervous organization of the person, some native peculiarity, which, however we name it, predisposes him to an outbreak of insanity. When two persons undergo a similar moral shock, or a similar prolonged anxiety, and one of them goes mad in consequence, while the other goes to sleep and goes to work and recovers his equanimity, it is plain that all the co-operating conditions have not been the same, that the entire cause has been different. What, then, has been the difference ? In the former case there has been present a most important element, which was happily wanting in the latter — there has been a certain hereditary neurosis, an unknown and variable quantity in the equation. Perhaps of all the erroneous notions concerning mind which metaphysics has engendered or abetted, there is none more false than that which tacitly assumes or explicitly declares that men are born with equal original mental capacity, opportunities and education determining the differences of subsequent development” (pp42-43; emphasis added).

Maudsley’s work is noteworthy in the present context because it will represent one of the main schools of thought in the shellshock debate when it comes. [THREAD = WW1 MILITARY MEDICINE AND COGNITIVE SCIENCE]

1870 The London-born chemistry student Sidney G. Thomas [Wikipedia biography=>1875] attends lectures on iron-making at Birkbeck College, London, and studies how phosphorus impurities might be removed during the smelting process. [THREAD = THE INDUSTRIAL AND SCIENTIFIC REVOLUTION]

********** CLASSIC PAPER IN COGNITIVE SCIENCE **********

1870 The German research physiologists Eduard Hitzig [Wikipedia biography] and Gustav Fritsch [Wikipedia biography] publish a paper entitled "Über die elektrische Erregbarkeit des Grosshirns" [in English as "On the Electrical Excitability of the Cerebrum"] in which they (a) review earlier studies of electrical stimulation of the surgically exposed cerebral cortex in animals, and then (b) describe investigations of their own using two dogs as subjects. They observe that excitation of the posterior aspects of the frontal lobe can initiate visible limb/postural movement, and they suggest this is a "Centrum die willkürliche Bewegung" [= "centre of/for voluntary movement"]. [THREAD = WW1 MILITARY MEDICINE AND COGNITIVE SCIENCE]

1870 [... Continued from 1863 (11th March)] The Royal Victoria Hospital, Netley, equips its "D Block" [given that he ran the place for several years, the best factsheet is C. Stanford Read's (1920) "Military Psychiatry in Peace and War" [full text online]] to handle psychiatric patients. [THREAD = WW1 MILITARY MEDICINE AND COGNITIVE SCIENCE]

ASIDE - "D BLOCK" IN WW1: During WW1 the Royal Victoria Hospital's D Block will treat some 15,000 psychiatric casualties, discharging those it can but sending on those requiring longer treatment. Its patients included Wilfred Owen [=>1915 (21st October)] prior to his transfer to Craiglockhart.
1870 The British neurologist Henry Maudsley presents a paper entitled "Body and Mind". [THREAD = WW1 MILITARY MEDICINE AND COGNITIVE SCIENCE]

1870 Jean de Reffye completes his latest project, the "Reffye 85", an 85mm rifled breech-loading cannon. The weapon is noteworthy in the present context for introducing easy-to-load brass cartridge ammunition. [THREAD = WW1 ARTILLERY]

1870 Alfred Nobel collaborates with Paul Barbe and a consortium of French investors to establish Dynamit Nobel and set up a dynamite manufacturing plant at Liverdun in north-eastern France. [THREAD = THE WW1 FINANCIAL AND ARMAMENTS INDUSTRIES]

1870 August Schluga von Rastenfeld continues to feed his Prussian spymasters valuable intelligence reports on the situation in Paris. [THREAD = WW1 ESPIONAGE AND INTELLIGENCE]

********** OIL BECOMES BIG BUSINESS **********

1870 (10th January) The U.S. businessman John D. Rockefeller and others found the Standard Oil Company. [THREAD = THE WW1 FINANCIAL AND ARMAMENTS INDUSTRIES]

1870 (3rd March) The Cardwell Reforms: The British Secretary of State for War Edward Cardwell initiates an extended parliamentary debate on plans to modernise the British Army (Hansard). One of the first iniquities to go will be the system whereby commissions can be purchased by those who can afford to do so, regardless of their ability as strategists, tacticians, or leaders of men. Other improvements will include the abolishing of flogging as a punishment and the withdrawal of 26,000 troops from overseas. [THREAD = WW1 ARMIES, TRADITIONS, AND TACTICS]

ASIDE: Do not confuse the "Cardwell Reforms" with either the "Childers Reforms" [=>1880 (28th April)] or the "Haldane Reforms" [=>1905 (10th December)].

1870 (12th March) The Bulgarian Exarchate: The Ottoman emperor, Abdülaziz, grants special religious dispensations to the Bulgarian Orthodox Church in its ongoing confrontation with the Greek Orthodox Church in Constantinople (continues at 1876 (20th April) ...]. [THREAD = THE SHAPING OF WW1 EUROPE]

1870 (30th April) Designed by Cowper Coles, HMS Captain enters service. As finally fitted out she has two twin turrets, rather than one as originally specified. Ominously the weight of this additional turret causes her to ride lower in the water than her designed (and already minimal) eight foot freeboard can cope with, and shifts her centre of gravity 10" [= 254mm] higher than it would otherwise have been, thereby rendering her dangerously top-heavy. [THREAD = THE WW1 SURFACE NAVIES]

1870 (19th May) Irish Home Rule [I - The Home Government Association]: The Irish lawyer-politician Isaac Butt forms the "Home Rule Association" [continues at 1873 (18th November)], a political discussion group in favour of Irish independence (continues at 1873 (18th November) ...]. [THREAD = THE SHAPING OF WW1 EUROPE]

1870 (14th June) Britain's Queen Victoria is blessed with a third grand-daughter from the strategically important royal marriage of their daughter,
Victoria, Princess Royal [<1859 (27th January)], to Crown Prince Friedrich of Prussia [<1859 (27th January)]. The infant is named Sophia [Wikipedia biography]=[1889 (27th October)], and the fact that this younger sister to the future Kaiser Wilhelm II [1859 (27th January)=1888 (15th June)] eventually marries into the Greek royal family [=>1889 (27th October)] means that we shall be hearing more of her once Greece has to decide which side to support in WW1 [=1915 (5th August)]. [THREAD = THE SHAPING OF THE MODERN WORLD]

1870 [5th July] **Helmuth von Moltke [the Elder]** [1866 (3rd July)<=>18th August] signs the Prussian Army's mobilisation orders. There will be three regional concentrations, namely (1) the 50,000-man First Army centred on Trèves/Trier and commanded by **Karl Friedrich von Steinmetz** [Wikipedia biography], (2) the 134,000-man Second Army, centred on Homburg [map, etc.] and commanded by **Prince Friedrich Karl** [Wikipedia biography]=19th August, and (3) the 125,000-man Third Army, centred on Landau [map, etc.] and commanded by **Crown Prince Friedrich [III of Germany]** [1888 [Wikipedia biography]=4th August]. The French Minister of War, **Edmond Leboeuf** [Wikipedia biography]=20th July, having recently upgraded his own systems, goes on record as believing that the French Army is admirably ready for war should it come. [THREAD = THE SHAPING OF WW1 EUROPE]

1870 [13th-18th July] **The Ems Incident**: Acting on instructions from Paris, the French ambassador to Berlin **Vincent Benedetti** [Wikipedia biography] holds private discussions with **Wilhelm I of Prussia** [1867 (12th February)<=>3rd September] concerning a potential House of Hohenzollern claim to the throne of Spain. Paris would like the king to block this claim now and for ever more, but it is actually not within his powers to comment and so matters are left at that. However subsequent reporting of the incident is deliberately biased by **Otto von Bismarck** [1867 (12th February)<=>1873 (23rd October)] to emphasise French warmongering and the necessarily "somewhat stern" tone of Prussia's response [see precise wording]. When this version of events, itself hastily translated into French, appears in the French newspapers on 14th July it brings Parisians out onto the streets demanding war [continues at 19th July ...]. [THREAD = THE SHAPING OF WW1 EUROPE]

A detailed account of the campaign can be found online - **highly recommended**. The war will be brought to a formal end by the **Treaty of Frankfurt** [=1871 (10th May)]. As a
war of manoeuvre, the war will last a mere six weeks, for the French Army will be comprehensively broken at the Battle of Sedan [=>1st September]; however it will then drag on for a further five months at the Siege of Paris [=>19th September]. The final outcome is the collapse of the French Second Empire and the exile of Napoléon III. The war is noteworthy in the present context (a) for clearly demonstrating the superiority of breech-loading field artillery, (b) for demonstrating that machine guns do not, of themselves, win battles, (c) for demonstrating that it is sometimes worth deliberately taking casualties in order to maintain the momentum of an advance, (d) for demonstrating the superiority of the Prussian General Staff, (e) for the Prussian capture of Alsace-Lorraine from France, and above all (f) as a national insult for France, who will spend the next 44 years aching for revenge. [THREAD = THE MAKING OF WW1 EUROPE]

WAR ART: See the excellent collection at the armchairgeneral website.

1870 [20th July] Now needed at the front Edmond Leboeuf [5th July=>19th August] is replaced as the French Minister of War by Pierre Dejean [Wikipedia biography]. [THREAD = THE SHAPING OF WW1 EUROPE]

1870 [4th August] The Battle of Wissembourg: This battle is fought as part of the Franco-Prussian War [<=19th July] between the Prussian Third Army under Crown Prince Friedrich [III of Germany] and forward elements of Patrice de MacMahon's [19th July=>6th August] right wing army under Charles Abel Douay [Wikipedia biography=>dies this day]. The outcome is a Prussian victory. [THREAD = THE SHAPING OF WW1 EUROPE]

1870 [6th August] The Battle of Wörth: This battle is fought as part of the Franco-Prussian War [<=19th July] between the advancing Prussian Third Army under Crown Prince Friedrich [III of Germany] and the French right wing army under Patrice de MacMahon [4th August=>1st September], that is to say, some 188,000 Prussians against some 113,000 French. The outcome is a Prussian victory, followed by a French retreat westward toward Nancy, and then northward towards Châlons-en-Champagne [previously Châlons-sur-Marne] to join forces with Napoléon III of France's [19th July<=1st September] newly arriving reserves. Hinged on the fixed fortifications at Metz, the Alsace-Lorraine doorway has been well and truly kicked in. [THREAD = THE SHAPING OF WW1 EUROPE]

1870 [17th August] The Battle of Mars-la-Tour: This battle is fought as part of the Franco-Prussian War [<=19th July] between advanced elements of the Prussian Second Army under Constantin von Alvensleben [Wikipedia biography] and the French left wing army under François Bazaine [Wikipedia biography=>18th August]. The outcome is an against-the-odds Prussian victory. [THREAD = THE SHAPING OF WW1 EUROPE]

1870 [18th August] The Battle of Gravelotte: This battle is fought as part of the Franco-Prussian War [<=19th July] between the combined Prussian First and Second Armies under Helmuth von Moltke [the Elder] [5th July<=1st September] and the French left wing army under François Bazaine [17th August=>19th August], that is to say, some 188,000 Prussians against some 113,000 French. The outcome is a Prussian victory, followed by a French withdrawal into the fortress city of Metz. Then, with the French in disarray von Moltke directs his Second Army toward Metz and his First Army to support the Third Army's push westward toward Nancy. Further south the Bavarians under Friedrich Franz II of Mecklenburg-Schwerin [Wikipedia biography=>2nd December] advance to stabilise their left flank. [THREAD = THE SHAPING OF WW1 EUROPE]
1870 [19th August-27th October] The Siege of Metz: This 10-week siege is fought out as part of the Franco-Prussian War [<=19th July] between the Prussian Second Army under Prince Friedrich Karl [5th July<=27th October] and the already mauled French left wing army under François Bazaine [17th August<=27th October] and Edmond Leboeuf [<=20th July]. The eventual outcome is a French surrender, with 142,000 men taken as prisoners-of-war. [THREAD = THE SHAPING OF WW1 EUROPE]

WAR MUSIC - THE SIEGESMARSCH VON METZ: A march to celebrate this victory was composed immediately after the event [YouTube it now]. [THREAD = WW1 ARMIES, TRADITIONS, AND TACTICS]

1870 [27th August] RMS Oceanic [1868 (18th January)<=1871 (16th March)] is launched at Harland and Wolff [1868 (18th January)<=1st December], Belfast, for service with the White Star Line [1868 (18th January)<=1st December]. At the same time Harland and Wolff take on Walter H. Wilson [Grace's Guide biography] and William J. Pirrie [1st Viscount Pirrie]1921 [Wikipedia biography]=>1895 (24th December) as directors. [THREAD = THE SHAPING OF WW1 EUROPE]

1870 [1st September] The Liverpool (father and son) engineers Charles H. Chadburn and William Chadburn [no convenient biography] are awarded a patent on an "engine-room telegraph system" [Wikipedia factsheet=>1874], that is to say, a two-way electro-mechanical communication system between a ship’s bridge and its engine-room [YouTube demonstration]1. [THREAD = WW1 SURFACE NAVIES]

1ASIDE: Note carefully how the engineer confirms receipt of the instructions from above.

**** "AND WE'RE CURSING HIS STAFF FOR INCOMPETENT SWINE"11 ****

1870 [1st-2nd September] The Battle of Sedan: This battle is fought between the French under Napoléon III of France [6th August<=4th September] and Patrice de MacMahon [6th August<=1871 (28th January)] and the Prussian First and Third Armies under Helmuth von Moltke [the Elder] [18th August<=3rd September]. The First Army, fresh from the Battle of Gravelotte [<=18th August], has approached from the east. The Third Army, having advanced along a more southerly line via Nancy, has approached from the south. Further careful manoeuvring soon has the French encircled and by the end of the day they have no choice but to surrender. The outcome is a crushing defeat for the French, with Napoléon himself, MacMahon, and 103,000 of their troops taken as prisoners-of-war. The battle is noteworthy in the present context for the effectiveness of the Prussian Army’s staff work2. [THREAD = THE SHAPING OF WW1 EUROPE]

12KEY MILITARY TROPE - "STAFF OFFICERS": The headline quotation is from "The General" (Sassoon, 1918), perhaps the most economical of all the WW1 war poems [full text at http://www.bartleby.com/136/12.html]. Staff officers are primarily administrators and organisers in uniform, not per se leaders of men. They have the same ranks as field commanders, but may be distinguished by this or that minor difference in uniform [see below] and their job is to get the fighting units to where they are needed on time, in the right order of arrival, and with all the necessary food, ammunition, tents, messengers, medical support and field chaplaincy, telecommunications, etc. And when staff-work goes wrong it erodes the combat effectiveness of the front-line troops. For example, at Sedan poor French staff work was (reportedly) responsible for the absence of some 100,000 men for want of trains to bring them to the front! It also seems that nobody knew how to work the French Army's new wonder-weapon ...

ASIDE: ... The Reffye Mitrailleuse [<=1863] seems to have been a victim of its own secrecy. Although around 200 guns existed, they began the war hidden away in the forts around Paris, and none of the crews earmarked to work them had yet been trained on them. The weapons were therefore seriously mis-deployed at Sedan in that they engaged at 2000 metres range in order to protect their crews from Prussian rifle fire. As a result they were too far away to observe (and thus correct) their fall of shot. The literature records - caustically - that the Reffye's greatest success was in executing captured Frenchmen during the Paris
Commune the following year [=>1871 (18th March)]. Nevertheless, the French will not adopt a replacement machine gun until 1897, at which point they go for the latest Hotchkiss.

**ASIDE - STAFF OFFICERS IN WW1**: Staff officers in the British Army typically wore red collar tabs and a red cap band [as in this rather disrespectful YouTube clip]. They have traditionally had rather a bad press (not helped by Sassoon's "incompetent swine" headline) but for the latest academic assessment of their performance see Frank Davies (2014) "Bloody Red Tabs".

1870 [3rd September or hereabouts] **The Army of the Meuse**: Having secured a great victory at the Battle of Sedan [<=1st September] Helmuth von Moltke [the Elder] [1st September<=19th September] now reorganises his First and Second Armies into the Army of the Meuse in readiness for a renewed advance on Paris. The new army commander will be the king himself, Wilhelm I of Prussia [13th July<=19th September]. [THREAD = THE SHAPING OF WW1 EUROPE]

********** FRANCE A REPUBLIC AGAIN **********

1870 [4th September] **The French Third Republic [I - The Government of National Defence]**: With Napoléon III of France [1st September<=d. in exile 1873 (8th January)] presently kicking his heels under Prussian guard, and the remnants of his armies falling back for a final stand in and around Paris, the French government takes emergency powers to declare the Second French Empire [<=1852 (2nd December)] at an end. In its place they proclaim a Government of National Defence headed by Louis Jules Trochu [Wikipedia biography=>1871 (25th January)] as president, Jules Favre [Wikipedia biography=>1871 (28th September)] as vice-president, and (based in Tours after 7th October) Léon Gambetta [Wikipedia biography] as Minister of War. They immediately renew their declaration of war, fortify Paris as best they can, and bring together units from across southern and western France to assemble a new army, the (brave but fighting well above their weight) "Army of the Loire", to the south of Paris. This administration will endure until the collapse of Paris itself [continues at 1871 (28th January) ...]. [THREAD = THE SHAPING OF WW1 EUROPE]

1**ASIDE**: Gambetta used one of the new hot-air balloons to fly out over the heads of the besieging Prussian troops.

1870 [5th-28th September] **The Lyon Unrest**: Urged on by the anarchist Mikhail Bakunin [1869 (6th September)<=1872 (2nd September)] disillusioned workers stage a month of protests and riots in Lyon, Central France. However with so many potential supporters presently tied up in the war with Prussia the unrest eventually subsides. This episode is noteworthy in the present context for Bakunin's running commentary on the events in "Letters to a Frenchman" [full text online]. This work's most quoted point will become the one about the "most irresistible" form of propaganda being action itself, an approach which will shortly become famous as the "propaganda of the deed" rationale for terrorist bombings and assassinations. [THREAD = THE SHAPING OF WW1 EUROPE]

**ASIDE - PROPAGANDA OF THE DEED IN WW1**: Lest it be overlooked, the assassination of Archduke Franz Ferdinand of Austria [Wikipedia biography=>1889 (30th January [ASIDE])] is just such a deed.

1870 [6th September] **HMS Captain**'s instability at sea [<=1870 (30th April)] proves fatal when she capsizes in rough weather, drowning her designer and all but 18 of her 500 crew. [THREAD = THE WW1 SURFACE NAVIES]

1870 [10th September] **SS Parthia** [Wikipedia shipography] is launched at William Denny and Company [Wikipedia factsheet=>1882], Dumbarton, for service with the Cunard Line [1867 (20th
March\(\Rightarrow\)1871 (16th March). She will make her maiden voyage from Liverpool to New York City on 17th December. [THREAD = THE SHAPING OF WW1 EUROPE]

********** PARIS BESIEGED **********

1870 ([19th September-28th January 1871]) The Siege of Paris, 1870-1871: This four-month siege is fought out as part of the Franco-Prussian War [\(\Rightarrow\)19th July] between the Prussian Army of the Meuse and Third Army under Wilhelm I of Prussia [\(\Rightarrow\)3rd September\(\Rightarrow\)30th November] and Helmuth von Moltke [the Elder] [1st September\(\Rightarrow\)1888 (10th August)] and the French garrisons in and around Paris under Louis Jules Trochu [4th September\(\Rightarrow\)1871 (25th January)] and Joseph Vinoy [Wikipedia biography]. The Prussians have available some 240,000 elated but weary regulars, and against them the French have raised some 400,000 reserves and National Guard militia, defending their capital and highly motivated. Elsewhere the Army of the North is holding the Prussian right wing around Amiens, the Army of the Loire is trying to break through to Paris from the south but is itself under attack around Orléans, and the Italian freedom fighter Giuseppe Garibaldi [\(\Rightarrow\)1867 (3rd November)] - hitherto no great friend of France - is organising a diversionary guerrilla campaign in the Vosges Mountains to pin down some of the Bavarian reserves. The eventual outcome is the fall of Paris and the simultaneous creation of the German Empire. The siege is noteworthy in the present context (a) for raising a need for time-fused ordnance for use against air balloons, and (b) for the development of micro-photographical techniques for miniaturising documents onto film so that the available carrier pigeon service can be used more effectively. [THREAD = THE SHAPING OF WW1 EUROPE] [THREAD = WW1 SIGNALLING AND TELECOMMUNICATIONS] [THREAD = WW1 ESPIONAGE AND INTELLIGENCE]

1\textit{ASIDE}: Built in 1841 and conveniently close to the Puteaux armaments works, the fort \textit{détaché} at Mont Valérien [museum website] performed military wonders holding the western defences of Paris together. Elsewhere the \textit{Périphérique} forts [\(\Rightarrow\)1840] hold the line.


********** ITALY FINALLY UNIFIED **********

1870 (20th September) The Capture of Rome: Taking advantage of French reverses in the Franco-Prussian War [\(\Rightarrow\)19th July], an Italian army under Victor Emmanuel II of Italy [\(\Rightarrow\)1866 (20th June)] and Raffaele Cadorna [Wikipedia biography] moves against the French-backed Papal States garrison at Rome. The outcome is a barely contested Italian victory, thus adding the final province - Lazio - to a unified Italy. [THREAD = THE SHAPING OF WW1 EUROPE]

********** BEFORE PROCEEDING **********

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FOR REASONS WHICH WILL SHORTLY BECOME APPARENT READERS ARE ADVISED AT THIS JUNCTURE TO PRE-READ THE STORY OF JOAN OF ARC’S PART IN THE DEFENCE OF ORLÉANS DURING THE HUNDRED YEARS WAR [\(\Rightarrow\)1429].

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********** GOD IS ASKED TO SAVE FRANCE AGAIN **********
1870 [9th October] The main Bavarian Army has now pushed the French Army of the Loire back to the gates of Orléans. Paris is under Prussian siege 80 miles to the north, and Tours, the provisional seat of government, is 60 miles behind the lines to the southwest. The Army of the Loire is large, but woefully inexperienced, poorly equipped, and poorly supplied. It is particularly short of experienced junior officers. To help raise morale the Archbishop of Tours, Joseph-Hippolyte Guibert, O.M.I.\(^1\) \([Wikipedia biography]\), reminds everyone that God, at least, is with them. In fact they are twice blessed, for it was at Orléans that Joan of Arc once won a great religious victory against the English \([<=1429 (18th June)]\), and it was at Tours that the relics of Saint Martin of Tours \([<=371]\) - long-time protector of the Franks - have only recently \([<=1860 (14th December)]\) come to light. The Army of the Loire even have their own holy banner\(^2\) \([see it now]\), one side of which has been embroidered with a Sacred Heart icon by the nuns of Paray-le-Monial, Burgundy, and the other side of which has been further embroidered with the text "Coeur de Jesus Sauvez la France" \(= "Sacred\) Heart, save France") by the nuns at Tours. This they presently have under guard in the tomb of Saint Martin at Tours and this they will shortly be taking onto the battlefield itself \(=>2nd December\). [THREAD = THE SHAPING OF WW1 EUROPE]

\(^1\) **ASIDE:** O.M.I. = Missionary Oblate of Mary Immaculate \([Wikipedia factsheet]\), a Catholic order for priests with "an ardent desire for their own perfection".

\(^2\) **ASIDE:** This is understanding of the exceptionally confused Internet resources on the subject. The University of Washington academic Raymond Jonas \([university homepage]\) covers these events in detail in “France and the Cult of the Sacred Heart” (Jonas 2000).

1870 [10th October] **The Battle of Artenay:** This battle is fought at Artenay, 15 miles north of Orléans, as part of the Loire Campaign of the Franco-Prussian War \(<=19th July\) between the I Bavarian Corps under Ludwig von der Tann \([Wikipedia biography]\) and the XV Corps of the French Army of the Loire under Joseph de la Motte \([no convenient biography]\). The outcome is a Bavarian victory with over 800 French taken as prisoners-of-war. [THREAD = THE SHAPING OF WW1 EUROPE]

1870 [11th-12th October] **The First [1870] Battle of Orléans:** This battle is fought as part of the Loire Campaign of the Franco-Prussian War \(<=19th July\) between the I Bavarian Corps under Ludwig von der Tann \(10th October<=9th November\) and elements of the XV Corps of the French Army of the Loire under Joseph de la Motte \(<=10th October\). The outcome is a Prussian victory, followed by the French evacuation of the city to a line through Patay and Coulmiers 10 miles to the west. [THREAD = THE SHAPING OF WW1 EUROPE]

1870 [27th October] **François Bazaine** \([19th August<=3rd December]\) accepts surrender terms at Metz, to become effective at 10.00am on 29th October. Over the ensuing weeks this will allow large numbers of Prussian troops to be transferred to the Paris and Loire Campaigns. These reinforcements are organised as a new First Army for service north of Paris under Edwin von Manteuffel \([Wikipedia biography]\) and a new Second Army for service on the Loire under Prince Friedrich Karl \([19th August<=3rd December]\). [THREAD = THE SHAPING OF WW1 EUROPE]

1870 [9th November] **The Battle of Coulmiers:** This battle is fought ten miles west of Orléans as part of the Loire Campaign of the Franco-Prussian War \(<=19th July\) between the 70,000-man French Army of the Loire under Louis d'Aurelle de Paladines \([Wikipedia biography]\) and the much smaller I Bavarian Corps under Ludwig von der Tann \(<=11th October\). The outcome is a with-the-odds morale-boosting French victory, complete with the re-occupation of Orléans. [THREAD = THE SHAPING OF WW1 EUROPE]
### 1870 [11th November] Martinmas, 1870: Given the French religious right's involvement in military decision making at this point in time the present author guesses that there will have been some heavy duty praying at the tomb of Saint Martin of Tours on this particular Saint Martin's Day [1860 (14th December [ASIDE])<=1886]. [THREAD = THE SHAPING OF WW1 EUROPE]

### 1870 [12th November or hereabouts] Under the aegis of the International Committee for Relief to the Wounded [1864 (22nd August)<=>1876 (6th February)] a contingent of British nurses arrives at Orléans. [THREAD = THE SHAPING OF WW1 EUROPE]

**ASIDE:** This story is told in detail by two of the nurses involved, Emma Pearson and Louisa MacLaughlin, in an 1871 memoir entitled "Our Adventures during the War of 1870" [full text online].

### 1870 [17th November] The cartridge manufacturing line at George Kynoch and Company [Grace's Guide factsheet=>1874], Birmingham, suffers its fourth explosion in two years, killing eight workers and injuring 20. [THREAD = THE WW1 FINANCIAL AND ARMAMENTS INDUSTRIES]

### 1870 [28th November] The Battle of Beaune-la-Rolande: This battle is fought as part of the Loire Campaign of the Franco-Prussian War [<=>19th July] between the French Army of the Loire under Joseph Crouzet [no convenient biography], presently moving north to try and break the Prussian lines around Paris, and a considerably smaller Prussian army under Konstantin von Voigts-Rhetz [Wikipedia biography], whose task it is to head them off. The outcome is an against-the-odds Prussian victory with heavily disproportionate French casualties and a French withdrawal towards Orléans. [THREAD = THE SHAPING OF WW1 EUROPE]

### 1870 [30th November] The Bavarian Kaiserbrief: Ludwig II of Bavaria [Wikipedia biography] now writes personally to Wilhelm I of Prussia [19th September<=>1871 (18th January)] confirming Bavaria's willingness to join a unified German Confederation, ceasing thereby to be a totally independent German-speaking kingdom. [THREAD = THE SHAPING OF WW1 EUROPE]

**ASIDE - BAVARIA IN WW1:** The terms of the deal allow for the Bavarian Army to remain separate from the Prussian, and their service oath remained to their king rather than to the Kaiser. They will hand over formal command to Berlin on 1st August 1914 [=>q.v.] and fight thereafter as the Sixth Army under Crown Prince Rupprecht of Bavaria [Wikipedia biography=>1914 (1st August)]. Some 200,000 Bavarian soldiers will die during the war.

### 1870 [1st December] RMS Atlantic [Wikipedia shipography=>1873 (1st April)] is launched at Harland and Wolff [27th August<=>1871 (4th July)], Belfast, for service with the White Star Line [27th August<=>1871 (16th March)]. She will make her maiden voyage from Liverpool to New York City on 8th June 1871. [THREAD = THE SHAPING OF WW1 EUROPE]

### 1870 [2nd December] The Battle of Loigny: This battle is fought as part of the Loire Campaign of the Franco-Prussian War [<=>19th July] between elements of the French Army of the Loire under Louis-Gaston de Sonis [Wikipedia biography] and elements of the Bavarian Army under Friedrich Franz II of Mecklenburg-Schwerin [18th August<=>3rd December]. Two early advances by the French XV and XVI Corps have been repulsed and by the late afternoon the focus of the action is the village of Loigny, where the 37th Regiment is struggling to hold off the Bavarians and the 51st Regiment is too disorganised about to advance to their aid. Here de Sonis determines that he will personally lead a do-or-die attempt to recapture Loigny using XVII Corps' last remaining experienced troops, namely a 800-strong composite battalion comprising
300 elite Volontiers de l’Ouest under Athanase de Charette [Wikipedia biography] and a further 500 franc-tireurs [= skirmishers, partisans] and militia. The Volontiers, also known as the "Zouaves Pontificaux"/"Papal Zouaves", are an international force of devout Catholics who have learned their war-craft defending the Papal States against the Italian Nationalists during the 1860s [<=1866 (20th June)]. To these therefore falls the honour of advancing under the aforementioned holy banner [<=9th October]. The outcome is an intense but ultimately unequal firefight in which the attackers suffer predictably heavy casualties (de Sonis himself losing a leg). They have little to show for their sacrifice other than having gained a valuable 30 minutes for the other Corps to withdraw in reasonably good order. [THREAD = WW1 ROMANTIC NATIONALISM]

ASIDE: After the battle a Memorial to the Sacred Heart [image] was erected in the renamed Bois de Zouaves outside Loigny, and nowadays a Zevisit tourist audioguide can be downloaded [download from http://www.zevist.com/TOURISME/US/Circuit/148-Audioguide-The-Battle-of-Loigny.html] to take pilgrims to key historic points around the town. Despite the setback de Sonis reports receiving a vision of the Blessed Virgin Mary who reassures him that France will outlive her present ordeal. The University of the West of England's Martin Simpson [Academic homepage] has recently given a detailed account of these events in a paper entitled "Commemorating Loigny" (Simpson, 2013 online). He writes, for example ...

"His charge neither seriously threatened the Prussian and Bavarian forces in Loigny, nor saved the battalions of the 37th, nor succeeded in staving off the collapse of the 51st Regiment. The charge only made sense in terms of expiatory self-sacrifice, it was suggested; the general's Christian convictions [...] had overtaken his military judgement" (op. cit., p5).

1870 (3rd-4th December) The Second [1870] Battle of Orléans: This battle is fought as part of the Loire Campaign of the Franco-Prussian War [<=19th July] between the Prussian Second Army under Prince Friedrich Karl [27th October<=1871 (10th January)] and the Bavarian Army under Friedrich Franz II of Mecklenburg-Schwerin [2nd December<=8th December] and elements of the French Army of the Loire under Louis d'Aurelle de Paladines [<=9th November] and Antoine Chanzy [Wikipedia biography] 5th December]. The outcome is a decisive Prussian victory and the reoccupation of Orléans. [THREAD = THE SHAPING OF WW1 EUROPE]

1871 (5th December and shortly thereafter) With Orléans back in the hands of the enemy, the French Army of the Loire has been cut in two. Léon Gambetta [<=4th September] therefore decides to treat them as two separate command entities, namely the (new) Army of the Loire under Antoine Chanzy [3rd December<=8th December] and the Army of the East under Charles Bourbaki [Wikipedia biography]. [THREAD = THE SHAPING OF WW1 EUROPE]

1871 (8th-10th December) The Battle of Beaugency: This battle is fought as part of the Loire Campaign of the Franco-Prussian War [<=19th July] between a Prussian army under Friedrich Franz II of Mecklenburg-Schwerin [<=3rd December] and the (much larger) French Army of the Loire under Antoine Chanzy [5th December<=1871 (10th January)]. The outcome is an against-the-odds Prussian victory. [THREAD = THE SHAPING OF WW1 EUROPE]

1871 The Gruson Company [1855 (1st June)<=1885] starts to produce armoured cupolae\(^1\) for modernising Germany's coastal defence forts. [THREAD = WW1 PERMANENT FORTIFICATIONS]

\(^1\)ASIDE - CUPOLAE IN WW1: A cupola is to a fortress what a turret is to a warship - it allows a gun mounting (a) to traverse bodily left or right, while at the same time (b) protecting the gun and those who must work it. In the 1930s [the Germans make little use of the tank in WW1 - Ed.] it will be Gruson who turn their skills to providing the turrets for the Nazi tank divisions.

1871 William A. Hammond [=1862 (25th April)] publishes "Treatise on Diseases of the Nervous System" [full text online]. [THREAD = WW1 MILITARY MEDICINE AND COGNITIVE SCIENCE]

1871 The British Army begins to roll out the Martini-Henry (Mark I) .458" calibre single shot black powder rifle [image]. The design includes an improved version of the Peabody Underlever Action [=1862], which did away with the external hammer in favour of an internal mechanism devised by the Swiss gunsmith Friedrich von Martini [Wikipedia biography], and will remain in service until replaced by the Lee-Metford .303" calibre magazine rifle in the 1890s. [THREAD = WW1 SMALL ARMS]

1871 The German entrepreneur-archaeologist Heinrich Schliemann [Wikipedia biography] starts excavation at Hissarlik, Turkey, suspecting it to be the site of ancient Troy. [THREAD = THE INDUSTRIAL AND SCIENTIFIC REVOLUTION]

1871 [10th-12th January] The Battle of Le Mans: This last-stand battle is fought as part of the Loire Campaign of the Franco-Prussian War [=1870 (19th July)] between a Prussian army under Prince Friedrich Karl [=1870 (3rd December)] and the desperately scraped together remnants of the Army of the Loire under Antoine Chanzy [=1870 (8th December)]. The outcome is a decisive Prussian victory followed by the collapse of the Army of the Loire as an effective fighting force. Unsupported, the Army of the East now falls back southward to Laval. [THREAD = THE SHAPING OF WW1 EUROPE]

**********  PRUSSIA FINALLY BECOMES GERMANY  **********
**********  PRUSSIA FINALLY BECOMES GERMANY  **********
**********  PRUSSIA FINALLY BECOMES GERMANY  **********
**********  BUT RETAINS HER "ANNEXATIONIST PROCLIVITIES"1  **********

1871 [18th January] The Final Unification of Germany [II - The Proclamation of Empire]: [... Continued from 1867 (12th February)] With the centre of Paris still under siege the Germans now gather in the Hall of Mirrors at Versailles to make the historic declaration that Prussia is now part of a unified German Empire - the "First Reich" - and that the first German emperor, or Kaiser, is going to be the existing Prussian king Wilhelm I of Prussia, henceforth Kaiser Wilhelm I [1870 (30th November)<=>1876 (17th February)]. [THREAD = THE SHAPING OF WW1 EUROPE]

1ASIDE: The headline phrase is taken from "The Annexation of Alsace-Lorraine and its Recovery" (Joffre 1918; [full text online]).

WAR ART: Check out Anton Werner's (1877) "The Proclamation of the German Empire".
1871 [25th January] Too proud to sign the final documents of surrender Louis Jules Trochu
[<=1870 (19th September)] resigns his acting premiership and is replaced by his vice-president Jules Favre [1870 (4th September)<=28th January]. [THREAD = THE SHAPING OF WW1 EUROPE]

********** THE CANNONS OF REVENGE GO ON ORDER **********

1871 [28th January-13th February] The French Third Republic [II - The Thiers National Assembly]: [...] Continued from 1870 (4th September) Finally convinced of the impossibility of further resistance Jules Favre [25th January<=10th May] now agrees with the Germans for an armistice to come into effect in Paris on 28th January and on the Amiens, Orléans, and other fronts on 5th February. The provisional Government of National Defence [<=1870 (4th September)] then formally surrenders and dissolves itself. The Germans then approve a replacement National Assembly and at its inaugural sitting on 13th February Favre will be replaced as acting president by the 73-year-old Adolphe Thiers [1840<=1873 (24th May)]. Favre does however retain the Foreign Ministry, putting arrangements in hand for a formal armistice signing at Versailles [continues at 26th February ...]. [THREAD = THE SHAPING OF WW1 EUROPE]

ASIDE: One of Thiers' first acts once the Germans move out of earshot is (reportedly) to instruct the Schneider Company [1836<=1876] to start building "the cannons of revenge". We shall be picking up this story shortly.

1871 [14th February] The Trade Union Act, 1871: The British Parliament passes an Act declaring that as a matter of principle the activities of trade unions are inherently lawful, even if they involve deeds which might well - in individuals - constitute the tort of "restraint of trade". [THREAD = THE WW1 WORKING CLASS SOLDIER]

1871 [26th February] The Treaty of Versailles: This temporary treaty between France and Germany brings the Franco-Prussian War [<=1870 (19th July)] to a preliminary end. A further more substantive document will be signed later in the year [=>10th May]. [THREAD = THE SHAPING OF WW1 EUROPE] [THREAD = WW1 TREATIES AND ALLIANCES]

********** IT'S THAT TUNE AGAIN **********

1871 [1st March] The victorious Germans stage a full-scale victory parade in Paris, marching down the Champs Élysée from the Arc de Triomphe. To cheer them on their way their bands play the Pariser Einzugsmarsch ["The Paris Entry-March": hear it now], just as they had in 1814 and just as they will do again on 14th June 1940 [see it now]. [THREAD = WW1 ROMANTIC NATIONALISM]

1871 [16th March] RMS Oceanic [1870 (27th August)<=1875 (11th March)] makes her maiden voyage from Liverpool to New York City. Her 14.5 knots and luxurious accommodation immediately creates a three-way commercial rivalry between (her owners) White Star Line [1870 (1st December)<=4th July], the Inman Line [1866 (21st March)<=1888 (15th March)], and the Cunard Line [1870 (10th September)<=1884 (20th September)]. [THREAD = THE SHAPING OF WW1 EUROPE]

********** THE PARISIANS BESIEGE THEMSELVES **********

1871 [18th March-28th May] The Paris Commune: This citizens' uprising comes only two months after the end of the Franco-Prussian War [<=1871 (18th January)] and has its roots in the terrible sufferings of the Parisian people during the recent four-month Prussian siege [<=1870 (19th September)]. The uprising is led by the not-completely-disarmed National Guard militia who have previously been helping to defend the city against the Prussians, and who have secreted away large stocks of arms and ammunition prior to the surrender. They now elect leaders from among their number and erect barricades against (their own) army under (no longer a prisoner-of-war) Patrice de MacMahon [28th January<=1873 (24th May)]. There follows a two-month-long stand-off during while the
two sides size each other up. The final government assault takes place between 21st and 28th May in what will become known as *la semaine sanglante* [= “the bloody week”] and will be followed by a period of reprisals in which upwards of 6000 *Communards* are executed1 more or less without trial. [THREAD = THE WW1 WORKING CLASS SOLDIER]

1 ASIDE: The new *Reffye Mitrailleuse* [<=1870 (1st September [ASIDE])] having (reportedly) been such a singular failure at the Battle of Sedan [<=1870 (1st September [ASIDE])] is now (reportedly) used against its own citizens in these reprisals. If so, then this is the first instance of the machine-gun as a method of execution/massacre [execution if the trials are accepted as legitimate, massacre if not - Ed.].

1871 [1st May] [Sir]1885 Garnet Wolseley [1st Viscount Wolseley]1885 [Wikipedia biography] is appointed Assistant Adjutant General at the War Office, and lends his weight to assisting the ongoing Cardwell Reforms [<=1870 (3rd March)]. [THREAD = WW1 ARMIES, TRADITIONS, AND TACTICS]

1871 [10th May] The French Third Republic [III - The Treaty of Frankfurt]: [... Continued from 28th January] This treaty between France and Germany brings the Franco-Prussian War [<=1870 (19th July)] to a formal end. Its main provisions are (a) the ceding of Alsace-Lorraine (Frenchmen who wish to remain French are given until 1st October the following year to get out), and (b) French reparations of five billion francs. Unable to prevent the forfeiture of Alsace-Lorraine, Jules Favre [<=28th January] resigns the Foreign Ministry on 2nd August [continues at 1875 (29th January) ...]. [THREAD = THE SHAPING OF WW1 EUROPE]

1871 [17th October] The *SS Adriatic* [Wikipedia shipography] is launched at Harland and Wolff [4th July<=>1889(19th January)], Belfast, for service with the White Star Line [4th July<=>1873 (1st April)]. [THREAD = THE SHAPING OF WW1 EUROPE]

1871 [2nd December] The Prussian government adopts the latest offering from the Mauser Company, the Model 1871 Gewehr [Wikipedia factsheet], a bolt-action single-shot 11mm general service rifle. This weapon will be converted for an eight-round tube magazine in 1884, and will remain in service until 1888. [THREAD = WW1 SMALL ARMS]

1872 The British businessman Thomas Cook [Wikipedia biography] expands his family travel agency as Thomas Cook and Son [modern corporate website]. [THREAD = THE SHAPING OF WW1 EUROPE]

1872 Tsarist persecution of Russia's Jewish population drives a steady stream of fugitives out of Eastern Europe en route for the U.S. The Norddeutscher-Lloyd Line [1864 (2nd May) => 20th August] profits from much of this windfall traffic. [THREAD = THE SHAPING OF WW1 EUROPE]

1872 Inspired by the planimeters [<=1824] exhibited at the 1851 World Fair [<=1851 (1st May)], the British engineer James Thomson [Wikipedia biography] experiments with a rudimentary mechanical calculating machine which uses the movements of a sphere, a disc, and a circular flat surface [Rutherford Journal image] to perform the mathematical procedure known as "integration" [Wikipedia tutorial]. Around the same time his younger brother Sir William Thomson [1st Baron Kelvin]1892 [1865 (17th July) => 1875 (?7th January)], having already devised (on paper) a suitable sequence of mathematical operations to do the job, starts to construct a hand-cranked tide-predicting machine [Wikipedia factsheet] out of suitably arranged gears and pulleys, each representing by its size and its rotational or linear displacement one step towards the final solution [continues at 1875 (?7th January) ...]. [THREAD = WW1 CYBERNETICS, COMPUTATIONAL SCIENCE, AND FIRE CONTROL]

1872 The American businessman Aaron Montgomery Ward [Wikipedia biography] sets up a mail order business aimed at "farmers and mechanics" and supported by a two-page catalogue flyer and newspaper advertising. So successful is he that by 1884 his catalogues will have grown to 240 pages. [THREAD = THE SHAPING OF WW1 EUROPE]


1872 [Sir]1876 Nathaniel Barnaby [1854 => 1874 (24th February)] succeeds Sir Edward Reid [=1863] as Chief Constructor of the Royal Navy (soon to be re-designated as Director of Naval Construction). He immediately faces some formidable judgement calls, not least managing the transition from muzzle-loading to breech-loading ordnance and deciding how best to use, and defend against, torpedoes. [THREAD = THE WW1 SURFACE NAVIES]
1872 The hulk **HMS Vernon**, out of commission since 1848, is anchored in Fountain Lake, Portsmouth Harbour, to act as a tender to **HMS Excellent** [<=1859] for torpedo and mine warfare training. [THREAD = THE WW1 SUBMARINE NAVIES]

1872 The French artilleryman **Charles de Bange** [Wikipedia biography=>1881] designs an "interrupted screw" breech mechanism for artillery pieces of all weights, which is both easy to use in action and a successful solution to the problem of breech gas obturation [= leakage]. He will be rewarded in 1873 with the Directorship of the Paris Arsenal, and will spend the rest of the decade developing 90mm, 120mm, and 155mm field artillery, a 220mm mortar, and 240mm and 270mm coastal defence guns. [THREAD = WW1 ARTILLERY]

1872 **Silas Weir Mitchell** [1864<=1875] publishes "**Injuries of the Nerves and the Consequences**" [full text online]. [THREAD = WW1 MILITARY MEDICINE AND COGNITIVE SCIENCE]

1872 [11th March] A new colliery is opened at **Seven Sisters** in the Dulais Valley, South Wales, to exploit one of the richest coal resources in the region. [THREAD = THE SHAPING OF WW1 EUROPE]

1872 [25th March] **HMS Thunderer** [1869 (26th March)<=1873 (19th April)] is launched. Due in part to a serious engine-room accident during her trials [=>1876 (14th July)], she will spend longer than usual (nearly five years) being fitted out. Sadly she will then suffer a second serious accident not long after entering service, when one of her forward 12" guns bursts [=>1879 (2nd January)]. All in all she will not enter service until 1881. [THREAD = THE WW1 SURFACE NAVIES]

**WAR ART:** Check out Frederick Bumford's "**HMS Thunderer**", noting that this was painted in 1979 for a modern audience. We shall be returning in due course to the issue of the over-romanticisation of war as a potential cause of war.

1872 [18th May] The Belgian industrial chemist **Ernest Solvay** [Wikipedia biography] patents the "**Solvay Process**" for the production of "soda ash"$^{1}$. [THREAD = THE INDUSTRIAL AND SCIENTIFIC REVOLUTION]

$^{1}$**ASIDE:** Soda ash is better known nowadays as sodium bicarbonate [Wikipedia chemistry] and the essence of the Solvay Process is to obtain it from two very cheap raw materials, namely sea water and limestone. The end product is widely used in the soap, textile, paper, and glass industries.


1872 [4th June] The American businessman **Robert Cheseborough** [Wikipedia biography] is granted U.S. Patent #127568 for a jellified by-product of petroleum refining which he has named "Vaseline", and which can be used to protect and soothe minor wounds. [THREAD = THE INDUSTRIAL AND SCIENTIFIC REVOLUTION]

**********  THE FRENCH RESOLVE "NEVER AGAIN!"  **********

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1872 [28th July] **Fortress France and Belgium [I - The Masterplan]:** Smarting from the French humiliation in the Franco-Prussian War [<=1870 (19th July)], the French government set up a **Comité de Defense** to mastermind a programme of upgrades to the nation's fixed fortifications. The best known of its members will be **Raymond Séré de Rivières** [Wikipedia biography=>1874], appointed Secretary in 1873 and Chief of Engineers in
1874. The resulting upgrades are based on the premise that Vauban's citadel system of fortressing \cite{1667} has been rendered obsolete by the sheer destructive power of modern artillery, and that instead all strategically important cities should be defended by a ring of linked forts, ideally in depth, some ten miles away. The committee identifies the Verdun and Paris sectors as requiring particular attention, but largely ignores France's north-western border, that is to say, in the Nord Pas-de-Calais region north of Lille because this will be protected vicariously by a parallel investment in fortifications at Liege and Namur by the Belgians\cite{1874} \cite{Brialmont}. Séré de Rivières also rationalises the armaments industry, so as to have a clear line of development from concept through testing to operational deployment. The separate elements are (a) a Technical Directorate with Commissions d'Experiences \cite{proving ground and performance evaluation facilities} at Bourges, Calais, Versailles, Troyes, Toulon, and Toul, (b) Ateliers \cite{craft workshops} at Bourges, Puteaux, and seven other cities, (c) Manufactures d'Armes \cite{arms factories} at Châtellerault, Tulle, and St. Etienne \cite{1764-1874}, (d) Pouderies \cite{gunpowder factories} at 11 sites, (e) Cartoucheries \cite{cartridge factories} at Valence and Algiers, (f) Parcs d'Artillerie des Corps Armées \cite{arsenals at the home towns of the 20 individual corps}, and (g) Parcs d'Artillerie de Place \cite{arsenals at the 28 main sectors of fixed fortification, for example, Verdun, Lille, and Toul}. \cite{Continues at 1874} \[THREAD = WW1 PERMANENT FORTIFICATIONS]\n
\textbf{1\textit{ASIDE}:} The Verdun sector had not been in the front line until the loss of Metz and Thionville in the Franco-Prussian War. The new defences were arranged as two concentric rings of fortifications centred on the ancient Verdun Citadel complemented by about the same number of "ouvrages" \cite{openings/bunkers}. Advanced students will find Cedric and Julie Vaubourg's \textit{fortissere} website invaluable in their research.\n
\textbf{2\textit{ASIDE}:} Of course if the Germans were ever to take Liege and Namur quickly and then strike southwards they would find the road to Paris quite thinly defended, save for some quite substantial fortifications around Mauberge. And this is precisely what the Germans worked out for themselves when they put together the Schlieffen Plan \cite{1894}. All they needed to do was to build up their fortress-busting siege artillery - and again this is precisely what they did \cite{1904} \cite{Big Bertha}.

1872 [20th August] The \textit{SS Mosel} \cite{no convenient shipography} is launched at Caird and Company \cite{25th November}, Greenock, for service with the Norddeutsche-Lloyd Line \cite{1872-1881}. \[THREAD = THE SHAPING OF WW1 EUROPE]\n
1872 [27th August] The first patients are admitted to the new \textit{South Yorkshire Lunatic Asylum} \cite{Wikipedia factsheet}. \[THREAD = WW1 MILITARY MEDICINE AND COGNITIVE SCIENCE]\n
\textbf{ASIDE - SOUTH YORKSHIRE ASYLUM IN WW1:} Early in 1915 the asylum is reorganised as the Wharncliffe War Hospital \cite{1915} \cite{1st April}.

**********  VARIANTS OF SOCIALISM EMERGE  **********

1872 [2nd-7th September] The International Workingmen's Association [VIII - The Fifth Annual Congress, The Hague]: \cite{... Continued from 1871} 61 delegates debate the relative merits of Mikhail Bakunin's \cite{1870} Anarchism and Karl Marx's \cite{1869} Marxism, the former calling the latter overly centralist and authoritarian and the latter - "a very able political conniver" - calling the former overly collectivist. The Marxists prevail and, true to accusation, promptly expel Bakunin from the Association. \[THREAD = THE WW1 WORKING CLASS SOLDIER]\n
********** LA BELLE ÉPOQUE BEGINS  **********

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1872 [13th September] Now that Paris's war rubble has been cleared and its windows reglazed [<=1870 (19th September)] the Folies Bergère cabaret-revue [Wikipedia factsheet] opens. [THREAD = THE SHAPING OF WW1 EUROPE]

1872 [2nd October] The (fictitious)\(^1\) English gentleman Phileas Fogg [Wikipedia biography] sets out from the Reform Club, London, having wagered £20,000 that he can travel around the world via Suez, Bombay, Calcutta, Hong Kong, Yokohama, San Francisco, and New York City in no more than 80 days [continues at 1873 (30th January) ...]. [THREAD = THE SHAPING OF WW1 EUROPE]

\(^1\)ASIDE: The story is told in Jules Verne's (1873) novel "Around the World in 80 Days".

1873 The British/German businessmen John T. Brunner [1st Baronet]\(^{1895}\) [Wikipedia biography] and Ludwig Mond [Wikipedia biography] \(d. 1909\) (11th December) set up Brunner, Mond, and Company [modern corporate website] at Winnington, Cheshire, there to exploit a Solvay Process [<=1872 (18th May)] licence to produce "soda ash". [THREAD = THE WW1 FINANCIAL AND ARMAMENTS INDUSTRIES]

ASIDE - BRUNNER AND MOND IN WW1: In the ensuing 40 years Brunner and Mond will diversify to become Britain's foremost industrial chemicals manufacturer, and in WW1 will make over a proportion of its capacity to the production of high explosives.

1873 The British experimental physicist Frederick Guthrie [Wikipedia biography] (13th February) notes during experimentation that if a static electricity source is used to create a negatively charged hot iron sphere it will quickly lose its charge to the atmosphere, whilst the same is not true of the same negatively charged. Guthrie's observations are now interpreted as an early example of the phenomenon of "thermionic emission" [Wikipedia factsheet], that is to say, the naturally occurring process by which electrons [=>1897 (30th April)] spontaneously break away from the surface of a heated electrode. [THREAD = THE SHAPING OF THE MODERN WORLD]

1873 Never particularly profitable, the Beaufort Ironworks [1862<= modern heritage trail] is finally closed down as uneconomical. [THREAD = THE WW1 WORKING CLASS SOLDIER]

1873 Based in New York City Colgate and Company [modern corporate website] start to sell toothpaste in jars. [THREAD = THE SHAPING OF WW1 EUROPE]

********** FRAY BENTOS IS BORN **********

1873 The Britain-based German chemist Justus von Liebig [Wikipedia biography] sets up the Liebig Extract of Meat Company [Wikipedia factsheet] to sell Uruguayan-sourced concentrated beef extract and canned corned beef [<=1867 (Armour)] under the brand label Fray Bentos. [THREAD = WW1 LOGISTICS]

********** IMPORTANT WW1 WEAPONS TECHNOLOGY **********

1873 The German chemist Herman Sprengel [Wikipedia biography] successfully demonstrates that picric acid [1841<=1885] is more than just a bright yellow dyestuff - it can be detonated as a high explosive. Around the same time Jean de Reffye [<=1870] completes his latest project, "the Reffye 75", a 75mm rifled breech-loading cannon [Wikipedia factsheet]. Around the same time the latest C1873 90mm field gun from the Krupp Arms Company [1867 (1st April)<=1873 below] implements a number of improvements suggested by field experience during the Franco-Prussian War [<=1870 (19th July)]. [THREAD = WW1 ARTILLERY]
1873 The Swedish industrialist Helge Palmcrantz [Wikipedia biography] patents a horizontally arrayed multi-barrelled machine gun, and sets about finding the funding necessary to manufacture it. [THREAD = WW1 MACHINE GUNS]

1873 Maximilian Schumann [<=1866] collaborates with the Gruson Company [<=1860] in the development of a recoil-absorption mechanism for closely confined fortress artillery. [THREAD = WW1 PERMANENT FORTIFICATIONS]

1873 Jean-Joseph Farcot [<=1868] publishes "Le Servo-Moteur" [in English as "Servomechanisms"], a treatise on power-assisted steering and related mechanisms. [THREAD = WW1 CYBERNETICS, COMPUTATIONAL SCIENCE, AND FIRE CONTROL]

**ASIDE - THE LOGIC OF SERVOMECHANISMS:** Servomechanisms (or "servos", or "slave systems") are important because they allow a small control system to control pieces of far heavier machinery - for example a helmsman his ship. Here is a quotable definition: "The 'servo' notion implies that heavy work is done by a strong slave under the direction of a master, who by virtue of this assistance need exert no effort beyond that of formulating commands" (Roberts, 1978:116). **Servomechanisms are noteworthy in the present context** (a) because warships are now too big to steer without power assistance, and (b) because artillery is now too big to aim without hydraulic, steam, or electrical traversal and elevation systems.

1873 After its success with the Navy Revolver [<=1851], Samuel Colt [1853 (1st January)<=>1883] now comes up with the Colt Single Action Army Revolver [see Larry Potterfield's YouTube tutorial], variously available in .45", .44", and .38" calibres and often branded as "the Peacemaker". Around the same time the Winchester Repeating Arms Company [1866<=>1883] releases its improved Winchester Model 1873 [YouTube demonstration]. The weapon is noteworthy in the present context (a) for its use of the .44" centre-fire cartridge, and (b) for its masterly marketing as "The Gun That Won the West". [THREAD = WW1 SMALL ARMS]

**ASIDE:** The plot of Anthony Mann's 1950 movie "Winchester '73" (Universal International) is woven around this weapon [YouTube trailer].

1873 The Cotton Powder Company [no convenient factsheet=>1913] builds new workshops close to John Hall and Company's [1847 (14th July)<=>1913] gunpowder factory at Faversham, Kent. Around the same time the latest C1873 90mm field gun from the Krupp Arms Company [1873 above<=>1877 (1st February)] implements a number of improvements suggested by field experience during the Franco-Prussian War [<=1870 (19th July)]. [THREAD = WW1 ARTILLERY] [THREAD = THE WW1 FINANCIAL AND ARMAMENTS INDUSTRIES]

1873 The Cotton Powder Company [no convenient factsheet=>1913] builds new workshops close to John Hall and Company's [1847 (14th July)<=>1913] gunpowder factory at Faversham, Kent. [THREAD = THE WW1 FINANCIAL AND ARMAMENTS INDUSTRIES]


1873 [14th January] The British Dynamite Company [1871<=1876] sets up a nitroglycerine factory at Ardeer, a remote location on the Firth of Clyde some 20 miles southwest of Glasgow. When completed it will be the world's largest explosives works. [THREAD = THE WW1 FINANCIAL AND ARMAMENTS INDUSTRIES]
1873 [18th January] Following the death of Frederick H. Elliott [<=1850] his widow Susan Elliott [no convenient biography=>1880 (25th March)] assumes control at Elliott Brothers [1870<==>1876]. She increasingly takes advice from the electrical engineer Willoughby Smith [Wikipedia biography=>1880 (25th March)] for which he is rewarded by being made a partner. [THREAD = WW1 CYBERNETICS, COMPUTATIONAL SCIENCE, AND FIRE CONTROL][THREAD = THE WW1 FINANCIAL AND ARMAMENTS INDUSTRIES]


1873 [7th March-7th March 1874] The Third Ashanti War, 1873-1874: This war of imperial enforcement is fought between a British taskforce under [Sir] Garnet Wolseley [1st Viscount Wolseley] (1871 (1st May)<==>1879 (11th January)) and the dissident Ashanti nation under its king Kofi Karikari [Wikipedia biography] (abdicates 1874 (26th October)). The outcome is a British victory, enforced by the Treaty of Fomena (=>1874 (7th March)). The journalist-explorer [Sir] Henry M. Stanley [=1871 (10th November)] and the war correspondent George A. Henty [=1867] cover the events for their respective editors. [THREAD = THE SHAPING OF WW1 EUROPE]

1 ASIDE: The First and Second Ashanti Wars are not covered in this resource.

1873 [1st April] Having diverted from New York City to Halifax, NS, due to bad weather, the White Star Line's RMS Atlantic [1871 (1st December)<=>1889 (19th January)] hits rocks on the run in to Halifax, and sinks with the loss of 535 lives. Artefacts from the wreck are still on show in Halifax's Maritime Museum of the Atlantic [museum website]. [THREAD = THE SHAPING OF WW1 EUROPE]

1873 [19th April] Slightly delayed by additional stability trials deemed necessary by the loss of HMS Captain [=1870 (6th September)], HMS Devastation [=1869 (12th November)] eventually enters service and, for some 15 years, she and her sister ship, HMS Thunderer [1872 (25th March)<=>1876 (14th July)], will be the most powerful warships in the world. [THREAD = THE WW1 SURFACE NAVIES]

1873 [24th April] Construction work starts on the Royal Italian Navy's new super-battleship Caio Diulio [Wikipedia shipography=>1876 (8th May)] at the La Spezia Naval Yard. Progress will be slow, however, thanks to a stream of specification changes by the ship's conceptual designer, the admiral-politician Benedetto Brin [Wikipedia biography]. The main stumbling block concerns the ship's main armament, which until 1876 is the subject of an "arms race" in miniature. As originally conceived, the ship is to be fitted with four 38-ton 10" guns. This will soon be changed to four 60-ton 13" guns, and then to four 100-ton (nominal) 18" [= 450mm] guns [continues at 1876 (8th May) ...]. [THREAD = THE WW1 SURFACE NAVIES]

1873 [24th May] Patrice de MacMahon [1871 (18th March)<=>1879 (30th January)] replaces Adolphe Thiers [1871 (28th January)<=>d. 1877 (3rd September)] as President of the French Third Republic. [THREAD = THE SHAPING OF WW1 EUROPE]

********** THE FIRST INDIAN DOCTOR **********

1873 [1st July] The Indian physician S. C. Goodeve Chuckerbutty [Wikipedia biography] is appointed Surgeon-Major to the Bengal Army. [THREAD = WW1 MILITARY MEDICINE AND COGNITIVE SCIENCE]

1873 [18th September] The Panic of 1873: The U.S. government ceases minting silver coins, thus depressing the market for that metal. This causes the market in silver to crash, which, in turn, brings down other over-extended markets, which, in turn, causes Stock
Markets around the world to crash. Among the first to go to the wall is the investment bank Jay Cooke and Company [Wikipedia factsheet], having suffered enormous paper losses on its vault-full of now near-worthless railways stocks and shares\(^1\). In the five-year-long debt avalanche which follows, some 18,000 U.S. business will fail, unemployment will soar, and starving workers will take to the streets. The situation in the anthracite coalfields of Pennsylvania is exacerbated by the activities of a Irish immigrants' workers' society named the "Molly Maguires" [Wikipedia factsheet]. [THREAD = THE WWI FINANCIAL AND ARMAMENTS INDUSTRIES]

\(^1\)ASIDE: The investment banking business model involves accumulating deposits from clients and then lending the accumulation, after expenses and commission, to governments or corporations faced with capital-intensive but ostensibly lucrative projects (such as railways, canals, telegraph cables, skyscrapers, etc.). The investment banker in this case, Jay Cooke [Wikipedia biography] made his first (and second) fortune raising money for the Union government during the American Civil War [<=1861 (17th April)], and then a third fortune in the early 1870s financing railway companies.

**ASIDE - INVESTMENT BANKS IN WW1:** At the time of writing [May 2014] the European Association for Banking and Financial History is organising a conference on the behaviour of European banks during WW1 [see conference website at http://inomics.com/economics/institutions/european-association-banking-and-financial-history-eabh-ev].

1873 [6th June] *The League of the Three Emperors [I - The Schönbrunn Convention]:* This treaty between the Russian, Austro-Hungarian, and (from 22nd October) German Empires commits the eastern half of Europe to diplomacy rather than war. Its provisions will be incorporated into the *Dreikaiserbund* later in the year [continues at 23rd October ...]. [THREAD = WWI TREATIES AND ALLIANCES]

1873 [23rd October] *The League of the Three Emperors [II - The Dreikaiserbund]:* [...Continued from 6th June] With France now Germany's sworn enemy the German Chancellor Otto von Bismarck [1870 (13th July)<=>1878 (13th June)] negotiates the *Dreikaiserbund* - the "League of the Three Emperors" - with Austria-Hungary and Russia. The arrangement will endure for a mere two years, collapsing as soon as Austria-Hungary and Russia fall out over the situation in the Balkans [continues at 1879 (7th October) ...]. [THREAD = WWI TREATIES AND ALLIANCES]


1874 [18th-21st November] *Irish Home Rule [II - The Home Rule League]* [...Continued from 1870 (19th May)] The *Home Government Association* [<=1870 (19th May)] now reconstitutes itself as the "Home Rule League" [Wikipedia factsheet] and starts to assemble candidates for the next British General Election. When this takes place in February 1874 they win 59 seats [continues at 1875 (21st April) ...]. [THREAD = THE SHAPING OF WW1 EUROPE]

1874 The 20-year-old Prince Louis of Battenberg [Wikipedia biography] takes his sub-lieutenant's examinations at the HMS *Excellent Shore Establishment* [<=1876 (26th April)] and gets an A-plus at gunnery. [THREAD = WW1 CYBERNETICS, COMPUTATIONAL SCIENCE, AND FIRE CONTROL]

1874 *Locating Brain Function [I - Bartholow and Wernicke]*: The American neurologist Robert Bartholow [Wikipedia biography] is the first directly to stimulate the human cortex electrically, applying a small faradic [= alternating] current to the exposed
The conductive properties of crystals a young German physicist named Karl Ferdinand Braun [Wikipedia biography] notes that lead sulphide crystals [the ore known as galena] which are heavily connected on one side but point connected on the other are "unilateral" in that they only pass current from one direction, specifically from the point side when negatively charged. This property can be used to "rectify" [= make unidirectional] an A.C. circuit to give a half wave D.C. [THREAD = THE SHAPING OF THE MODERN WORLD]

The paddle steamer Iona [=1866] is retrofitted with a Chadburn Engine-Room Telegraph [=1870 (1st September)]. [THREAD = WW1 SURFACE NAVIES]

The British businessmen William T. Eley [no convenient biography] and his brothers expand their Eley Brothers' Cartridge Company [Wikipedia factsheet] to meet increasing demand for metal cartridges. Around the same time the Tod and Macgregor Shipyard [=1865 (6th December)] is taken over by Handyside and Henderson and Company [Grace's Guide factsheet]. Around the same time the American rancher-businessman Isaac L. Ellwood [Wikipedia biography] goes into partnership with Joseph Glidden [Wikipedia biography] as the I. L. Ellwood Manufacturing Company to produce barbed wire. [THREAD = THE WW1 FINANCIAL AND ARMAMENTS INDUSTRIES]

ASIDE - ELEY BROTHERS IN WW1: An Internet source (unchecked) credits Eley brothers with producing 209 million .303" rifle cartridges in WW1 and invites us to compare George Kynoch and Company [1870 (17th November)<>1884 (16th July)], Birmingham, who manage more than ten times that.

The German revolutionary socialist Johann Most [Wikipedia biography>1885] is elected as a Social Democrat to the Berlin Reichstag, but is soon arrested for preaching violent protest. Similar arrests follow in Paris and London as he moves his operations around Europe, and so in 1882 he will emigrate to the USA to liven up political debate over there. [THREAD = THE SHAPING OF WW1 EUROPE]

Aware of the previous work of Édouard de Martinville [=1857 (26th January)], the Scottish-born American Alexander Graham Bell [Wikipedia biography>1876], inventor and teacher of the deaf, devises his own apparatus to explain how the human ear transduces physical sound. He starts by obtaining a human skull from a mortuary, dissecting out the temporal bone, complete with the dead man's inner ear, and connecting a short stylus to the incus, one of the bones of the inner ear. He then positions a speaking cup up against the eardrum, and tilts the whole arrangement so that the stylus is just touching against a small smoke-blackened glass panel on a slide-table. If he then talks into the speaking cup and moves the slide-table at the same time the vibrations of the stylus leave behind it a visible trace of the sound wave. Because his instrument generates the visible signature of sounds Bell adopts de Martinville's term...
"phonograph". More importantly, given the present context, Bell's observations lead him to the membrane-to-membrane concept of a talking telegraph, or "telephone". [THREAD = WW1 SIGNALLING AND TELECOMMUNICATIONS]

**ASIDE**: The use of pen-on-paper or stylus-on-smoked-glass is the 19th century equivalent (a) of the pen tracing oscillograph systems used in seismographs, myographs, electroencephalographs, and electrocardiographs in the mid-20th century, and (b) of the computer software pixel tracing systems used nowadays.

1874 The St. Étienne Arsenal re-machines the Chassepot Rifle [<=1866] to take a brass cartridge. The result is known as the Fusil Gras M80 [YouTube demonstration]. It will remain in service until replaced over a decade later by the Lebel Rifle [=>1886], and, in all, some half million units will be produced. [THREAD = WW1 SMALL ARMS]

1874 Fortress France and Belgium [II - Verdun-Tavannes and Antwerp]: [...] Continued from 1872 (28th July)] As part of the initial ("forts de la panique") phase of the Séré de Rivières upgrades [<=1872 (28th July)], construction work begins on Tavannes Fort, on the heights to the northeast of Verdun. Unlike other forts in this sector, Tavannes has no turrets or cupolae, and only one cast steel casemate, namely a "Cloche Pamart" [which still remains to be visited - see fortiessere image]. Around the same time the Belgian military engineer Henri Brialmont [Wikipedia biography=>1885 (1st January)] designs a double ring of forts around Antwerp, turning the entire city into one great "National Redoubt" [Wikipedia factsheet=>1914 (16th August)]. Each fort is either a pentagonal or a triangular combination of inner citadel and outer fossée sec [= "dry moat"]. There are 18 forts in the outer ring, and 12 in the inner ring [continues at 1875 ...]. [THREAD = WW1 PERMANENT FORTIFICATIONS]

**ASIDE**: Two of Brialmont's Antwerp forts are preserved as museum sites, and another is rigged out for paintball combat!

1874 HMS Vesuvius joins HMS Vernon [1872<=>1876] to assist trials of Whitehead torpedo technology [<=1860]. [THREAD = THE WW1 SUBMARINE NAVIES]

1874 The American inventor William Gardner [no convenient biography=>1879 (??th August)] constructs a prototype hopper-fed cranked action .45" calibre machine gun, and assigns production rights to the Pratt and Whitney Company [1860<=>1875]. [THREAD = WW1 MACHINE GUNS]

1874 [17th February] Amongst the Conservative Members of Parliament elected in the 1874 General Election is the industrialist [Sir]1874 George Elliott [1864<=>1882]. [THREAD = THE SHAPING OF WW1 EUROPE]

1874 [24th February] Working to design studies by [Sir]1876 Nathaniel Barnaby [<=1872], construction work begins at Portsmouth Dockyard on HMS Inflexible [Wikipedia shipography=>1876 (27th April)], a class-of-one battleship. The ship is essentially an armoured steel citadel surrounded by unarmoured bow and stern sections to make it sea-worthy. Within this central citadel are mounted four 81-ton 16" [= 406mm] rifled muzzle-loading guns (the largest yet mounted on a Royal Navy ship) in two twin turrets set en echelon within the citadel. Other innovations include (a) horizontal armour as well as vertical, because the increasing range of artillery has made it necessary to protect against plunging long-distance shot, (b) four 14" Whitehead torpedoes, (c) complex hull compartmentalisation, (d) in places the thickest armour until now [or since - Ed.] fitted to a warship, and (e) electric lighting throughout. [THREAD = THE WW1 SURFACE NAVIES]
1874 [14th March] The Treaty of Fomena: This treaty between Britain and the Ashanti Kingdom brings the Third Ashanti War [<=1873 (7th March)] to a formal end. The main provision is that the Ashanti should pay over a punitive sum of 50,000 ounces of gold. [THREAD = THE SHAPING OF WW1 EUROPE]

1874 [25th March] Having learned much from his secondment to the Union Army balloon corps during the American Civil War [<=1863], Ferdinand von Zeppelin [1863<=1891] produces the conceptual design for a large steerable [= "dirigible"] powered balloon. [THREAD = WW1 AVIATION]

1874 [April or hereabouts] Workers at the Cyfarthfa Ironworks [1867 (4th August)<=>1879 (10th May)] come out on strike. Such is the impact of the strikers' demands upon an already struggling business that Robert Thompson-Crawshay [1867 (4th August)<=>1879 (10th May)] shuts down the works, and keeps it shut until the market recovers in 1879. [THREAD = THE WW1 WORKING CLASS SOLDIER]

1874 [17th June] The French telegraph engineer Jean-Maurice-Émile Baudot [Wikipedia biography] develops the Baudot printing telegraph, a system capable of sending the full alphabet, plus the numbers and the most common punctuation marks, using only a five-key keyboard. The system will be adopted in 1877 by the French telegraph service, and improved versions will be in use in the British Post Office around the turn of the century. [THREAD = WW1 SIGNALLING AND TELECOMMUNICATIONS]

ASIDE: The historical importance of Baudot's system (also known as the International Telegraph Code No. 1) lies in the fact that it is the first to use on-off binary electrical switching. A five-key keyboard actually allows only a 32-item codebook, so Baudot prefixed his transmissions with a reserved code indicating whether what followed was from the alphabetic list, or a second list comprising the digits and the punctuation marks. The code was particularly efficient in practice because it could be punched across a paper tape, rather than along it (as with Morse code), allowing all five bit settings to be read simultaneously. The system will be widely enhanced in the early 20th century by the likes of Donald Murray [=>1900 (27th February)] and Frederick Creed [=>1902], This tape format is also important to the history of computing, because during World War Two it was used (a) in two of the Nazi's main cipher machines (the Lorenz SZ40/42 and the Siemens and Halske Geheimschreiber), and (b) in many of the Allies' experimental code-breaking computers. Baudot also invented what would nowadays be termed "time-division multiplexing" technology, that is to say, a method by which a number of operators could send their messages in microscopic "time slots", to be separated out at the receiving end.

1874 [2nd July] The Dakota Gold Rush: It having been rumoured that gold had been found in the black hills, the U.S. Army resolves to check for itself and sends a column of 7th Cavalry under George A. Custer [1868 (27th November)<=>1876 (8th February)]. This historical event is noteworthy in the present context as an economic casus belli, in that it changed the Dakotas overnight from Indian land back into a land of opportunity (once a way could be found around the treaties which had so generously given it to the Indians in the first place). [THREAD = WAR AND ATROCITY]

1874 [23rd July] Cardiff Docks [VII - Roath Basin Opened/Roath Dock Authorised]: [... Continued from 1866 (10th August)] The new Roath Basin opens for business, but because it lacks the necessary capacity Parliament authorises a new dock beyond it [continues at 1887 (24th August)]...]. [THREAD = THE SHAPING OF WW1 EUROPE]

1874 [7th August] The U.S. Army begins to develop an artillery proving ground at Sandy Hook, NJ [map, etc.]. [THREAD = THE SHAPING OF THE MODERN WORLD]
1874 [7th December] Having contracted with the Pinkerton Detective Agency [<=1862] to provide him with a small private army of "coal police" [= hired thugs], the Pennsylvania coal owner Franklin B. Gowen [Wikipedia biography] arbitrarily imposes a 20% wage cut in his collieries. [THREAD = THE WW1 WORKING CLASS SOLDIER]

********** "SPINAL CONCUSSION" IS DEBATED **********
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1875 Nervous Shock [IV - "Railway Spine"]: [...] Continuing from 1866] Following up on his earlier contribution to the railway compensation culture debate, the British physician John E. Erichsen [1866<=1882 (?7th January)] now publishes "On Concussion of the Spine, and Other Obscure Injuries of the Nervous System" [full text of 1882 edition online], in which, amongst other things, he further investigates the nature of "jar or shake of the [spinal] cord without obvious lesion". Here are some indicative conclusions ...  

"The primary effects of these concussions or commotions of the spinal cord are probably due to molecular changes in its structure. The secondary are mostly of an inflammatory character, or are dependent on retrogressive organic changes, such as softening, etc., consequent on interference with its nutrition. It would appear that surgeons and writers on diseases of the nervous system have included four distinct pathological conditions under this one term, " Concussion of the Spine," viz., 1. A jar or shake of the cord, disordering, to a greater or less degree, its functions, without any lesion perceptible to the unaided eye. 2. Compression of the cord slowly produced by the extravasation of blood. 3. Compression of the cord by inflammatory exudations, serum, lymph, or pus within the spinal canal ; and, 4. Chronic alterations of the structure of the cord itself as the result of impairment of nutrition consequent on the occurrence of one or other of the preceding pathological states, but chiefly of the third. These various conditions differ remarkably from one another in their symptoms and effects, and have only this in common, that they are not dependent upon an obvious external injury of the spine ..." (Erichsen, 1875; emphases added).

On the basis of his observations Erichsen then proposes a difficult-to-observe class of physical injury named "spinal concussion". The story here will be well recounted a hundred years later by the cultural historian Wolfgang Schivelbusch [Wikipedia biography] in his 1977 book "The Railway Journey: the Industrialisation of Time and Space in the 19th Century", especially Chapter 9 therein, entitled "Railroad Accident, 'Railway Spine', and Traumatic Neurosis" [full text online]. Here is an indicative extract ...  

"Only material, i.e., pathologically demonstrable, damage caused to accident victims qualified them for compensation. Thus the compensation of physically injured victims caused no problems, but those victims who suffered damage without a pathologically demonstrable cause created - in the period between 1865 and 1885 - a legal and medical problem whose solution in the courts depended on the medical profession. The medical experts called upon in compensation cases had to determine whether the claimant's ailment was an imaginary one, simulated in order to receive compensation from the railroad company, or whether it was a manifestation of a new medical syndrome. The medical explanations given for the new symptoms changed significantly during those two decades. The initial explanation was a pathological one. The experts decided on either simulation or a supposed microscopic deterioration of the spinal cord (railway spine) due to mechanical shock caused by the accident. [...] From the early 1880s on, the purely pathological view was superseded by a new, psychopathological one, according to which the shock caused by the accident did not affect the tissue of the spinal marrow, but affected the victim psychically. Now it was the victim's experience of shock that was the main causative factor of the illness. By the end of the 1880s, the concept of 'railway spine' had been replaced by that of 'traumatic neurosis'" (Schivelbusch, 1977, pp134-136; emphases added).

Schivelbusch continues ...
"Thus a newspaper report on an unhurt participant in the great disaster on the Paris-Versailles line in 1842: 'We saw a woman who had been in the first compartment of the car that followed right behind the locomotives; she had not received any injury, but had experienced a commotion so extreme when confronted by this horrible disaster that she did not remember anything of it at all. [...] Two things were constant in reports given by traumatised accident victims. Immediately after the accident the victim felt completely normal; after one or two days he became overwhelmed by the memory of the event. We have a report by Charles Dickens: On 9 June 1865, he experienced a minor railroad accident and escaped entirely unscathed. Four days later he discussed it in a letter, describing how he assisted other travellers immediately after the accident occurred. [He wrote:"

'I was not on the least fluttered at the time ... But in writing these scanty words of recollection I feel the shake and I am obliged to stop'

[other examples given] In medical literature the new subject appeared for the first time in 1866. The Lancet published a three-part article by Thomas Buzzard entitled 'On cases of Injury from Railway Accidents'. In the same year William Camps [...] published 'Railway Accidents and Collisions' [...] And] finally, that year also saw the publication of an epoch-making book by John Eric Erichsen, On Railway and Other Injuries of the Nervous System. [...] Here is William Camps’ description of the particular nature of the railroad accident:

There is something in [railway collisions] which would seem to produce effects upon the nervous system quite beyond those of any ordinary injury. In some cases, we are told, the sufferer may not even have sustained any fracture, and the cuts and external injuries may be apparently slight [...] yet there may be coincident with all this such a shock to the system as for a time to shatter the whole constitution, and this, moreover, to such a degree, to such an extent, that the unfortunate sufferer may not altogether recover throughout the remainder of his life [...]” (Schivelbusch, 1977, pp137-139; emphases added).

Schivelbusch also identifies what he believes is the "decisive passage" in Erichsen's work, as follows ...

"'It is important to observe that a serious accident may give rise to two distinct forms of nervous shock ... The first is mental or moral, and the second purely physical. These forms of 'shock' may be developed separately, or they may co-exist. It is most important ... to distinguish between these two, and if co-existing to assign to each other its proper importance.' [...] He also] detected a new, entirely specific quality in the rail accident that distinguished it from all other kinds of accidents:

During a hospital practice of thirty years I can scarcely recall to mind a single case in which the emotional or hysterical state that I am about to describe has been met with after, or as a consequence of, any of the ordinary accidents of civil life. But I have seen many instances of it after railway concussions. Is this due to the frantic terror which often seizes upon the sufferers from railway collisions, or is it due to some peculiarity in the accident, some vibratory thrill transmitted through the nervous system by the peculiarity of the accident? I am disposed to think that terror has much to do with its production. It must be remembered that railway accidents have this peculiarity, that they come upon the sufferers instantaneously without warning, or with but a few seconds for preparation, and that the utter helplessness of a human being in the midst of the great masses in motion renders these accidents peculiarly terrible.” (Schivelbusch, 1977, pp142-143; emphases added).

The "Railway Spine/Spinal Concussion Debate" is noteworthy in the present context because precisely the same theoretical uncertainties - that is to say, whether an injury can be either entirely psychological or else so microscopically physical that it cannot be physically described - will arise in due course when dealing with WW1 cases of "shellshock" [continues at 1882 (?th January) ...]. [THREAD = WW1 MILITARY MEDICINE AND COGNITIVE SCIENCE]

1875 The Aberdare Ironworks [<=1818] and the Plymouth Ironworks [<=1834], once prides of the early Industrial Revolution, go out of business due to the global downturn. [THREAD = THE WW1 WORKING CLASS SOLDIER]

1875 The Socialist Workers' Party of Germany [Wikipedia factsheet] popularises the use of the word "Genosse" [= "fellow traveller"/"comrade"] as its preferred form of interpersonal greeting. [THREAD = THE SHAPING OF WW1 EUROPE]

₁CAUTION: In modern English usage the phrase "fellow traveller" has acquired the strongly negative connotation of "opportunistic hanger-on". In the original German sense a Genosse was someone you knew because they really were going the same way; hence, by extension, a friend of opportunity and shared objectives.

********** PSYCHOLOGY BECOMES A SCIENCE ₁ **********

1875 The American philosopher-psychologist William James [Wikipedia biography] establishes an experimental psychology laboratory at Harvard University. [THREAD = WW1 MILITARY MEDICINE AND COGNITIVE SCIENCE]

₁ASIDE: In its theoretical aspects psychology had been "mental philosophy" ever since Plato's time, with a recent sprinkling of "psychophysics" since Gustav Fechner [<=1860] and Hermann von Helmholtz [<=1863]. However, the understanding and treatment of mental illness and acquired neurological defects such as aphasia were simply specialisms within neurology.


1875 The American inventor Frank S. Baldwin [Wikipedia biography] patents the "pinwheel", as an alternative to the age-old cogwheel for carrying out the tens-carry operation in mechanical calculators. This device will become the core component of the commercially highly successful Odhner and Monroe type of calculator. In 1912 Baldwin will teamed up with Jay Randolph Monroe [no convenient biography] to found the Monroe Calculator Company [Wikipedia factsheet]. The modern term "number crunching" comes from the often ominous grinding noise the pinwheel calculators made when doing large sums. [THREAD = WW1 CYBERNETICS, COMPUTATIONAL SCIENCE, AND FIRE CONTROL]

1875 Erhard and Arthur Junghans [<=1861 (15th April)] update their family clock-making business with modern American mass production techniques. [THREAD = THE WW1 FINANCIAL AND ARMAMENTS INDUSTRIES]

1875 The French artillery officer Henri de Lahitolle [Wikipedia biography] designs the "Lahitolle Modèle 1875", a 95mm steel cannon with a screw breech. It will serve in WW1 both as a field and a fortress weapon. [THREAD = WW1 ARTILLERY]

1875 The French military engineer Henri-Louis-Philippe Mougin [Wikipedia biography] designs a turret for fort-based 155mm guns. Each turret weighs 160 tons, mounts two guns, rotates on a circular track set down into the structure of the fort, and is protected...
vertically by a laminated iron dome and horizontally by its concrete shoulder-work. The artillery pieces are specially built to be pivoted at the muzzle end, with elevation at the breech end, meaning that no part of the barrel needs to project beyond the confines of the turret. A cheaper casemate version is available for sites where top mounting is not practicable, or where costs need to be kept down. After proving ground trials the system will be installed at many of the Séré de Rivières series of forts (<=1872) under construction at this time. Around the same time the Gruson Armaments Company (<=1855 (1st June)) extends its portfolio of Festungsrüsterei (= "fortress artillery") by offering a high-performance Hartguss (= "hard cast") Steel Panzerturm (= "armoured tower/cupola") fitted with two 150mm cannons. These are installed at a number of locations in the Metz sector, including Fort Woippy. [THREAD = WW1 PERMANENT FORTIFICATIONS]

1875 Fortress France and Belgium [III - Verdun-Marre/Souville]: [...] Continued from 1874] As part of the initial ("forts de la panique") phase of the Séré de Rivières upgrades (<=1872 (28th July)), construction work begins on Fort Marre and Fort de Souville, both "flat arrow" layouts on the heights around Verdun. These are positioned so as to form an inner ring of fortifications which will eventually include Tavannes, Belleville, Saint-Michel, Belrupt, Regret, and La Chaume [see http://thetunnel.free.fr/verdun/forteres.html for map] [continues at 1877 ...]. [THREAD = WW1 PERMANENT FORTIFICATIONS]

ASIDE - FORT DE SOUVILLE IN WW1: Fort Souville is destined to become a keystone in the defence of the Verdun sector after Douaumont is captured in the early days of the German 1916 Verdun Offensive (=>1916 (21st February)). Both forts are now ruins in the countryside. Entry below ground is both formally forbidden, often illegal, and decidedly unsafe, but educational tourism of the Verdun battlefields is being increasingly encouraged officially and it is often possible to walk heritage trails through key sites [see the Verdun Open Air Museum website].

********** NEURASTHENIA AGAIN **********

1875 Neurasthenia [II - Mitchell (1875)]: [...] Continued from 1869] Silas Weir Mitchell (1872<=1887) publishes "Fat and Blood: An Essay on the Treatment of Certain Forms of Neurasthenia and Hysteria" [Project Gutenberg full text online=>1887], in which he applies George M. Beard's (1869<=1878) notion of "neurasthenia" to his own casebook, using seclusion, total rest, and careful nutrition in the treatment of "men or women subject to states of feebleness or neurasthenia". His casebook contains not just many underweight women, but occasionally also injured veterans, thus ... "A woman, most often between twenty and thirty years of age, undergoes a season of trial or encounters some prolonged strain. [...] But, no matter how it comes about, whether from illness, anxiety, or prolonged physical effort, the woman grows pale and thin, eats little, or if she eats does not profit by it. Everything wearies her,—to sew, to write, to read, to walk,—and by and by the sofa or the bed is her only comfort. [...] If the case did not begin with uterine troubles, they soon appear, and are usually treated in vain if the general means employed to build up the bodily health fail, as in many of these cases they do fail. [...] If such a person is by nature emotional she is sure to become more so, for even the firmest women lose self-control at last under incessant feebleness. Nor is this less true of men; and I have many a time seen soldiers who had ridden boldly with Sheridan or fought gallantly with Grant become, under the influence of painful nerve-wounds, as irritable and hysterically emotional as the veriest girl" (op. cit.; Chapter III).

As we shall be seeing in due course, this usage will remain popular until well into WW1 to describe cases of shell-shock (=>1915 (Arthur J. Brock)) [continues at 1880 ...]. [THREAD = WW1 MILITARY MEDICINE AND COGNITIVE SCIENCE]
1875 The Swedish-born engineer Thorsten Nordenfelt [Wikipedia biography] comes to a financing agreement with Helge Palmcrantz [<=1873] to manufacture the latter's "xylophone" design as the Nordenfelt Machine Gun [Wikipedia image]. Different models will come in different calibres up to 1", and with different numbers of barrels. Around the same time Pratt and Whitney [1874<=1879 (??th August)] demonstrate their version of the Gardner machine gun [<=1874] at the U.S. Naval Yard, Washington, DC. No orders are forthcoming, however. [THREAD = WW1 MACHINE GUNS]

********** TWO IMPORTANT NEUROSCIENTISTS **********

1875 Locating Brain Function [II - Meynert and Ferrier]: [...] Continued from 1874] The German-born Austrian neurologist and psychiatrist Theodor Meynert [Wikipedia biography] is appointed medical director of the University of Vienna Psychiatric Clinic, rapidly turning it into a centre of clinical and theoretical excellence. His contribution to neuroscience will be emphasised by future historians, thus...

"Meynert combined his ingenious exact findings with results of the upcoming neuropathology, neurochemistry and neuropsychology into a prodigious coherent system representing the complexity of the human brain-world relationship. These achievements reveal Meynert as the founder of scientific brain research" (Seitelberger, 1997 online).

Meynert's works are noteworthy in the present context (a) for drawing scientific attention to "cytoarchitectonics" [Wikipedia factsheet] - the study of neural microstructure - and the sheer impenetrability of that microstructure, even under the most powerful microscope, and (b) for his contributions to the already vigorous debate as to the localisability of cerebral function [<=1874 (Bartholow)]. Around the same time the British neurologist [Sir]1891 David Ferrier [Wikipedia biography] publishes a monograph on functional neuroanatomy entitled "The Functions of the Brain", in which he reports observations from a series of brain-stimulation studies in a variety of animals. The book includes a later-famous functional mapping of the dog's brain [see it now]. [THREAD = WW1 MILITARY MEDINE AND COGNITIVE SCIENCE]

1RESEARCH ISSUE: Neuroscience in 2014 still has little to no idea how trillions of individually unremarkable microscopic connections between neurons somehow combine to give us our thoughts, memories, and emotions. For a review of some of the competing approaches see the Companion Resource. For our own standard introduction to neural microanatomy see the Companion Resource.

1875 The Irish-born American engineer John P. Holland [Wikipedia biography] submits designs for a submarine to the U.S. Navy. The proposal is declined, leaving Holland to spend the next 22 years working with private funding to build a working prototype. Around the same time Robert Whitehead [<=1860] buys out the failed Whitehead-Luppis torpedo company [<=1860], and starts to persuade the Austro-Hungarian War Office of the potential of the new weapon. [THREAD = THE WW1 SUBMARINE NAVIES]

**** "NEVER MORE BEAUTIFUL THAN HERE UNDER THE GUNS' NOISE"1 ****

1ASIDE - FOLKSONGS IN WW1: Another trenches favourite seems to have been David Owen's [Wikipedia biography] "Dafydd y Garreg Wen" [= "David of the White Rock"], composed around 1740 [hear it now]. Because this latter work includes the phrase "David, play, and come through the gates of death" (Hughes translation) it naturally appeals to soldiers in general (and soldiers named David in particular) on the eve of battle. Thus David Jones (Royal Welsh Fusiliers) gives it a mention in his 1937 memoir "In Parenthesis" (where it is sung by...
his semi-fictional Lance-Corporal Lewis [p42]), and so too does Ivor Gurney (Gloucestershire Regiment), from whose 1920 poem "First Time In" we have taken the headline quotation.

1875 The British research physiologist Richard Caton [Wikipedia biography] reports successfully using a galvanometer [Wikipedia factsheet] to detect electrical activity from the surface of the cerebrum in dogs and apes. [THREAD = WW1 MILITARY MEDICINE AND COGNITIVE SCIENCE]

1875 [1st January] Coal miners in Pennsylvania come out on strike. [THREAD = THE WW1 WORKING CLASS SOLDIER]

1875 [??th January] [...] Continued from 1872] Sir William Thomson [1st Baron Kelvin] presents his tide-predicting machine [<=1872] to the Edinburgh Royal Society and then again on ??th August to the British Association for the Advancement of Science at Bristol [continues at 1876 ...]. [THREAD = WW1 CYBERNETICS, COMPUTATIONAL SCIENCE, AND FIRE CONTROL]

1875 [29th January-30th November] The French Third Republic [III - The Eventual Constitution]: [...] Continued from 1871 (28th January)] This year-long debate gradually pieces together a compromise new French republican constitution featuring a President, a Senate, and a Chamber of Deputies. As finally agreed, the "Third Republic" will endure until the WW2 Battle of France [=1940 (22nd June)]. [THREAD = THE SHAPING OF WW1 EUROPE]

1875 [11th March] The RMS Oceanic [1871 (16th March)<=>1890 (7th January)] is sold to the Occidental and Oriental Steamship Company [no convenient factsheet] to work the San Francisco - Yokohama - Hong Kong route. [THREAD = THE SHAPING OF WW1 EUROPE]

1875 [16th April] Newport Docks [VII - Alexandra North Dock Opened]: [...] Continued from 1868 (?7th May)] After seven years in the construction the Alexandra North Dock opens for business [continues at 1883 (30th January) ...]. [THREAD = THE SHAPING OF WW1 EUROPE]

1875 [21st April] Irish Home Rule [III - Enter Parnell]: [...] Continued from 1873 (21st November)] Charles S. Parnell [Wikipedia biography] is elected in a by-election as the latest Member of Parliament for the Home Rule League [1873 (18th November)<=> 1877 (28th August)]. His energy, his extensive contacts, and his sense of purpose will lift him rapidly through the ranks [continues at 1882 (17th October) ...]. [THREAD = THE SHAPING OF WW1 EUROPE]

**********  THE BALKAN POWDER TRAIL IS LIT  **********
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1875 [9th July] The Balkan Crisis [I - The Herzegovina Uprising, 1875-1877]: After months of tit-for-tat violence the province of Herzegovina descends into outright rebellion against the Ottoman Empire. Other non-Muslim provinces close at hand (Bosnia, Montenegro, and Serbia) either join in or give support, and the immediate "Balkan Crisis" culminates in the Serbo-Turkish [=1876 (30th June)] and Russo-Turkish [=1877 (24th April)] Wars, as well as the rebellions in Bulgaria [=1876 (20th April)] and Romania [=1877 (21st May)]. These events are noteworthy in the present context because the resulting treaties of Constantinople [=1876 (23rd December)] and Berlin [=1878 (13th June)] and the League of the Three Emperors [=1879 (7th October)] then divide Europe into its 1914 antagonists and establish the famous "Balkan powder-keg" [Wikipedia factsheet]. [THREAD = THE SHAPING OF WW1 EUROPE]
1875 [22nd August] The Edgar Thomson Steel Works [Wikipedia factsheet], North Braddock, PA, goes into production. One of the main investors is the Scottish-born American entrepreneur Andrew Carnegie [Wikipedia biography=>1878 (??th May)]. [THREAD = THE WW1 FINANCIAL AND ARMAMENTS INDUSTRIES]

1875 [15th September] A new trans-Atlantic cable comes into operation. [THREAD = WW1 SIGNALLING AND TELECOMMUNICATIONS]

********** A TUNE SO PITIFUL**********

1875 [11th November] Llanelli Rugby Football Club [modern corporate website] is founded, drawing supporters from the iron, steel, and tinplate works in the region. The club soon¹ adopts the song "Sospan Fach" [= "The Little Saucepan" - [hearing] as its signature tune. [THREAD = THE WW1 WORKING CLASS SOLDIER]²

¹ASIDE - SOSPAN FACH IN WW1: We have as yet been unable to determine who wrote this catchy little ditty³, or when, but it was definitely sung by Welsh battalions in WW1. It was much liked, for example, by the poet-hero Robert Graves [=1914 (3rd August)] who, in his 1920 poem of the same name, recalls calling for "the Sospan" to be sung on a route march to cheer the spirits. "Four collier lads from Ebbw Vale" duly oblige, only to bring painful memories flooding back ...  

"[...]  
Who knows a tune so soft, so strong,  
So pitiful as that 'Saucepan' song  
For exiled hope, despaired desire  
Of lost souls for their cottage fire?  
Then low at first with gathering sound  
Rose their four voices, smooth and round  
Till back went Time: once more I stood  
With Fusiliers in Mametz Wood.  
[...]  
The storm blows over, Sun comes out,  
The choir breaks up with jest and shout  
With what relief I watch them part -  
Another note would break my heart!"

The full text of Graves' poem is contained, along with other material of relevance, in G.M. Griffiths' 2011 [highly recommended] blog "Move Him Into the Sun".

²ASIDE: For reasons which do not presently concern us the game of rugby football is a middle class entertainment in the south-east of England but a working class entertainment in Wales and northern England.

³ASIDE: Sosban Fach was featured on 14th September 2014 in the first episode of Cerys Matthews' new investigative folksong TV series "Y Goeden Faled" [= "The Ballad Tree"] (S4C). It turns out that the received explanation is that the work was composed in about 1895 by two visitors to the spa town of Llanwrtyd Wells, Mid-Wales, specifically one W. Talog Williams and the Rev. D. M. Davies (although their relative contribution is unknown and was still much argued about in 1915), and specifically at Britannia House on Irfon Crescent, the town's main street (which nowadays boasts a commemorative plaque to this effect [see this at http://www.geograph.org.uk/photo/3163828]). The reason the song was then linked so firmly to Llanelli, 50 miles away, is that Llanwrtyd was a popular place for the tin-workers - who of course made sosbanau for a living - of Llanelli to visit, to take the waters, and then celebrate afterward.

1875 [16th November] The battleship HMS Superb [Wikipedia shipography=>1880 (15th November)] is launched at the Thames Ironworks and Shipbuilding Company [1863 (12th December)<=1885 (15th June)]. [THREAD = THE WW1 SURFACE NAVIES]
1875 [11th December] Having contrived a plan to benefit from his own life insurance policy as "lost at sea", a Scottish-born Nova Scotian named Alexander Keith [Wikipedia biography] d. self-inflicted wounds ca. 18th December books a ticket on the SS Mosel [<=1872 (20th August)], plants a large time-bomb in his luggage, and covertly disembarks. Unfortunately for him his luggage is heavily handled while being lifted from the quay and the bomb goes off prematurely, killing 80 bystanders. [THREAD = THE SHAPING OF WW1 EUROPE]

1876 Following the bankruptcy of Immanuel Nobel's munitions factory in St. Petersburg, Russia, his sons Ludwig Nobel [Wikipedia biography] and Robert Nobel [Wikipedia biography], buy into an oil refinery at Baku [modern Azerbaijan]. As the company expands, the Nobels establish an in-house research laboratory in order to explore profitable new oil by-products. In 1878 they order the world's first oil tanker [continues at 1879 ...]. [THREAD = THE WW1 FINANCIAL AND ARMAMENTS INDUSTRIES]

1876 Elliott Brothers [1873<=>1880 (25th March)] expands into the telegraph equipment industry. [THREAD = WW1 CYBERNETICS, COMPUTATIONAL SCIENCE, AND FIRE CONTROL] [THREAD = THE WW1 FINANCIAL AND ARMAMENTS INDUSTRIES]

********** A NEW TECHNOLOGICAL ARMS RACE **********

1876 The Armour Race [I - The Spezia Trials]: Europe's iron and steel works get together at Spezia, Italy, to compare performance. The Schneider Company [1871 (28th January) <=> 1877], goes straight to the top of the class with its 22" [=56mm] mild steel plate. Their precise process is both a military and a commercial secret, or course, but the rumour is soon circulating that the 22" plate has been carefully hammered down from an ingot some four times as thick [continues at 1877 ...].

ASIDE: This entry needs four-threading (a/b) because good armour is needed both at sea and on land [THREAD = THE WW1 SURFACE NAVIES] [THREAD = WW1 PERMANENT FORTIFICATIONS], (c) because when it is your enemy's armour you need to hit it as often as possible (a far-from-straightforward task on land, let alone at sea) [THREAD = WW1 CYBERNETICS, COMPUTATIONAL SCIENCE, AND FIRE-CONTROL - see next entry], and (d) because when you hit it you need armour piercing projectiles in order to inflict maximum damage [THREAD = WW1 ARTILLERY].

********** CONTINUOUS ANALOG COMPUTING IS BORN **********

1876 (... Continued from 1875 (?th January)) Having already demonstrated the principles of his tide predicting machine [<=1872 and 1875 (?th January)] Sir William Thomson [1st Baron Kelvin]1892 [1875 (?th January) <=> 1882 (25th August)] now delivers the latest prototype to the Meteorological Office, who, after due evaluation, commission a full-scale version. [THREAD = WW1 CYBERNETICS, COMPUTATIONAL SCIENCE, AND FIRE CONTROL]

********** MUSIC TO DIE FOR **********

1876 Following the success of "Myfanwy", Joseph Parry [<=1875] now composes the hymn tune "Aberystwyth" [hear it now] => 1897 (Enoch Sontonga). [THREAD = WW1 TRENCH SONGS]

ASIDE - HYMNS IN WW1: Robert Graves [=1929] notes ...

"The Welsh always sang when pretending not to be scared; it kept them steady. And they never sang out of tune." (Goodbye to All That, p81).

Soldiers being soldiers, however, bawdy versions were often sung to the same tune. One of the most famous of these is Joseph M. Scriven's (1855) "What a Friend We Have in Jesus" [hear it now] which reappeared in WW1 as "When this Bloody War is Over" [hear it now]. As for Aberystwyth, the lyric will normally be the 1740 Charles Wesley hymn "Jesus, Lover of my
Soul” [full text]. The WW1 poet David Jones [=1937] will later recall "... and the Royal Welsh sing Jesu lover of me soul ... to Aberystwyth" (In Parenthesis, p160), and Robert Graves [=1929] further notes ...

" We marched towards the flashes, and could soon see the flare-lights curving across the distant trenches. The noise of the guns grew louder and louder. Presently we were among the batteries. From about two hundred yards behind us, on the left of the road, a salvo of four shells whizzed suddenly over our heads. This broke up Aberystwyth in the middle of a verse ..." (Goodbye to All That, p81).

1876 The German engineer Nikolaus Otto [Wikipedia biography] [=1885] patents a four-stroke internal combustion gas engine. [THREAD = THE INDUSTRIAL AND SCIENTIFIC REVOLUTION]

1876 Alfred Nobel [1871<=1887] patents "blasting gelatine", a solid combination of nitroglycerine and nitrocellulose, soon to be marketed as "gelignite". At around the same time his German headquarters company renames itself Dynamit A.G. [Wikipedia factsheet], a French development company is set up under the name Société Générale pour la Fabrication de la Dynamite, and the British Dynamite Company [=1873 (14th January)] reorganises itself as Nobel's Explosives Company. [THREAD = THE WW1 FINANCIAL AND ARMAMENTS INDUSTRIES]

1876 The Philadelphia World Fair: To celebrate its centenary as an independent nation, the US stages a Centennial Fair in Philadelphia. Alexander Graham Bell [1874<=>10th March] exhibits his new telephone system and is awarded the Gold Medal in the electricals category. [THREAD = WW1 SIGNALLING AND TELECOMMUNICATIONS]

1876 A German career diplomat named Friedrich von Holstein [Wikipedia biography] joins the Political Section of the German Foreign Ministry, where, over the ensuing 30 years, he will acquire a reputation as a political "monster of the labyrinth". [THREAD = THE SHAPING OF WW1 EUROPE]

1876 [6th February/16th November] The International Committee for Relief to the Wounded [=1870 (12th November)] is rebadged as the International Committee of the Red Cross [=1914 (15th October)]. Later in the year the Muslim Ottoman Empire, unwilling to act under Christian/Crusader symbolism, adopts the Red Crescent [modern corporate website] as its equivalent of the Red Cross. [THREAD = WW1 RELIEF AGENCIES]

ASIDE - THE RED CROSS/CRESSENT IN WW1: This will be dealt with in due course [=1914 (15th October) and follow the onward pointers].

1876 [8th February-21st April 1877] The Great Sioux War, 1876-1877: Prompted by the Dakota gold rush [=1874], this war is fought between the U.S. Army and the Native American tribes resident in the Dakota Black Hills. It begins with a telegram of authorisation from Philip H. Sheridan [Wikipedia biography] and continues as separate columns of advance, the first under George R. Crook [Wikipedia biography] [=17th March], the second under George A. Custer [Wikipedia biography] [1874 (2nd July)<=17th June], the third under Ranald S. Mackenzie [Wikipedia biography], and the fourth under Nelson A. Miles [Wikipedia biography] [=1877 (8th January)]. Here are the most salient events ...

The Battle of Powder River, 1876; The Battle of the Rosebud, 1876; The Battle of the Little Bighorn, 1876; The Fort Robinson Massacre, 1876; The Battle of Wolf Mountain, 1877

The overall outcome is a victory for the U.S. Army and the dispersal of the Native Americans to less coveted hunting grounds. [THREAD = THE SHAPING OF WW1 EUROPE]
1876 [17th February] With Kaiser Wilhelm I [1871 (18th January)<=1888 (9th March)] already an Emperor [<=1871 (18th January)], the British Prime Minister, Benjamin Disraeli [Wikipedia biography], sets the Royal Titles Bill before Parliament, the main proposal of which is that the British monarch (currently a female, of course) should have included in her title the words "Empress of India". The Bill will be passed during the summer and celebrated formally at the First Delhi Durbar the following year [>=1877 (1st January)].

[THREAD = THE SHAPING OF WW1 EUROPE]

1876 [10th March] Encouraged by an ageing Joseph Henry [=1835], assisted by the engineer Thomas A. Watson [Wikipedia biography], and with his patent application already filed, Alexander Graham Bell [1876<=14th June] successfully transmits his first natural sounds along a wire. Bell's equipment will be demonstrated at the Philadelphia Centennial Exhibition later that same year. Commercial development of the product will take place in partnership with the lawyer Gardiner G. Hubbard (father of one of his pupils, later to become his wife) and the businessman Thomas Sanders (father of another of his pupils). Not surprisingly Bell's invention is poorly received by the already immensely powerful Western Union Telegraph Company [=1851], who immediately secure the services of Thomas A. Edison and Gray to try to devise a rival system (unsuccessfully, as it happens, for their attempts will eventually be adjudged in breach of Bell's patents).

[THREAD = WW1 SIGNALLING AND TELECOMMUNICATIONS]

1876 [17th March] The Battle of Powder River: This battle is fought as part of the Great Sioux War [<=8th February] between elements of George R. Crook's [<=8th February] column under Joseph J. Reynolds [Wikipedia biography] and a Cheyenne Indian village on the west bank of the Powder River. The outcome is a burned village, destroyed winter stores, a handful of dead, and an enduring hatred of the white man.

[THREAD = THE SHAPING OF WW1 EUROPE]

1876 [30th March] The Explosive Substances Act, 1876: In an attempt to regulate health and safety within the munitions industry and thereby reduce the number of factory disasters [e.g.<=1871 (11th August)], the British Government passes an Act setting down not just factory design and production monitoring requirements but also appropriate standards for the safe transportation of explosives.

[THREAD = THE WW1 FINANCIAL AND ARMAMENTS INDUSTRIES]

**********  THE BALKAN CRISIS SPREADS  **********

1876 [20th April-??th May] The Balkan Crisis [II - The Great Bulgarian Uprising]: [...Continued from 1870 (12th March)] This nationalist uprising is fought between a Bulgarian nationalist army under Stefan Stambolov [Wikipedia biography] and an occupying Ottoman army under Hafuz Pasha [Wikipedia biography]. The outcome is that Ottoman rule is brutally1 re-established, but only in the short term [continues at 1876 (23rd December) ...].

[THREAD = THE SHAPING OF WW1 EUROPE]

1ASIDE: The British Parliament monitors the Turkish atrocities in Bulgaria in some detail - see Hansards, 1876-7.

1876 [26th April] HMS Vernon [=1872] is joined by HMS Ariadne, a decommissioned 26-gun steam frigate, to become the HMS Vernon Shore Establishment [=1895 (23rd April)]. The new establishment hosts the Royal Navy’s new Mine and Torpedo School. The Gunnery School remains at HMS Excellent [=1872]. [THREAD = THE WW1 SURFACE NAVIES]

1876 [27th April] HMS Inflexible [Wikipedia shipography] is launched at Portsmouth Dockyard and proceeds to the fitting-out basin to have her armament fitted. This will
consist of four of the William Armstrong Company's new 80-ton 16" (=406mm) rifled muzzle-loaders. [THREAD = THE WW1 SURFACE NAVIES]

1876 [8th May] The Caio Duilio [1873 (24th April)<=1880 (6th January)] is launched and proceeds to the fitting-out basin to have her armament fitted. This will consist of four of the William Armstrong Company's new 100-ton 450mm (=17.7") rifled muzzle-loaders [continues at 1880 (6th January) ...]. [THREAD = THE WW1 SURFACE NAVIES]

1876 [14th June] Under licence from Alexander Graham Bell [10th March<=1877 (9th July)] British investors form the Telephone Company Limited [no convenient factsheet=>1880 (13th May)]. At much the same time British believers in Thomas A. Edison's "speaking telegraph" system form the Edison Telephone Company London Limited [no convenient factsheet]. [THREAD = WW1 SIGNALLING AND TELECOMMUNICATIONS]

1876 [17th June] The Battle of the Rosebud: This battle is fought as part of the Great Sioux War [<=8th February] between George A. Custer's [8th February<=25th June] column and a concentration of Lakota Sioux and Northern Cheyenne under Chief Crazy Horse [Wikipedia biography]=>1877 (8th January) on the Rosebud River [map, etc.]. The outcome is a Lakota/Cheyenne victory. [THREAD = THE SHAPING OF WW1 EUROPE]

1876 [25th June] The Battle of the Little Bighorn: This battle is fought as part of the Great Sioux War [<=8th February] between George A. Custer's [17th June<= dies this day] column and a concentration of Lakota, Cheyenne, and Arapaho on the Little Bighorn River. The outcome is the famous "Custer's Last Stand". The battle is noteworthy in the present context for its flawed decision making [see Companion Resource]. [THREAD = THE SHAPING OF WW1 EUROPE]

1876 [30th June-3rd March 1878] The Balkan Crisis [III - The Serbo-Turkish War, 1876-1878]: [... Continued from 20th April] This war of national assertion is fought between a Serbian/Montenegrannationalist army under Mikhail Chernyayev [Wikipedia biography] and an occupying Ottoman army under Abdülkerim Pasha [Wikipedia biography]. Italian and Russian volunteer brigades give valuable support to the nationalists. The eventual outcome, facilitated by the Russian victory in the broader Russo-Turkish War [=>1877 (24th April)] and rubber-stamped by the Treaty of San Stefano [=>1878 (3rd March)] is Serbian independence [continues at 23rd December ...]. [THREAD = THE SHAPING OF WW1 EUROPE]

1876 [14th July] HMS Thunderer [1873 (19th April)<=1879 (2nd January)] suffers a boiler explosion which kills 45 crew [see the wreckage]. The incident is noteworthy in the present context as a case study in the need for proper training and maintenance when dealing with technology, for it will emerge during the Board of Inquiry that the boiler pressure gauge was inaccurate and the safety valves had seized. [THREAD = THE WW1 SURFACE NAVIES]

1876 [26th July] The foundation stone of the new Fulham Union Infirmary ("The Workhouse" factsheet) is ceremonially laid. The facility will be fully open for patients in 1884. [THREAD = WW1 MILITARY MEDICINE AND COGNITIVE SCIENCE]

ASIDE - FULHAM WAR HOSPITAL IN WW1: In 1915 Fulham Infirmary's facilities are requisitioned by the War Office as Fulham War Hospital, and capacity doubled to around 1000 beds. Patients include injured German prisoners-of-war. The considerably stately Syon House [Wikipedia factsheet] (nowadays the Hilton London Syon Park) is requisitioned as an annexe for officers, and the equally well-appointed Fulham Palace [Wikipedia factsheet] is further requisitioned in 1918 as an annexe for the specialist treatment of shellshock.
1876 [18th November] The London Underground [II - Progress]: [...] Continued from 1863 (10th January)]

The Metropolitan Railway Company [1863 (10th January)<>1884 (6th October)] opens its latest station at Aldgate [see map at 1863 (10th January)] [continues at 1884 (6th October) ...]. [THREAD = THE SHAPING OF WW1 EUROPE]

1876 [23rd December-20th January 1877] The Balkan Crisis [IV - The Constantinople Conference]: [...] Continued from 30th June] This month-long session of European diplomacy attempts to settle the Herzegovinian [=1875 (9th July)] and Bulgarian [=20th April] questions. The parties involved are Britain, Russia, France, Germany, Austria-Hungary, and Italy, with the U.S.A. providing an independent secretariat. The eventual proposals are (a) that Bosnia and the northern part of Herzegovina should become independent, (b) that the southern part of Herzegovina should become part of Montenegro, and (c) that Bulgaria should be split into eastern and western autonomous provinces, with capitals at Tarnovo and Sofia, respectively. However after a month of discussions the Ottomans refuse to approve these proposals and prepare instead to settle the dispute militarily [continues 1877 (24th April) ...]. [THREAD = THE SHAPING OF WW1 EUROPE] [THREAD = WW1 TREATIES AND ALLIANCES]

1877 Fortress France and Belgium [IV - Aisne and Verdun]: [...] Continued from 1875] As part of the Séré de Rivières upgrades [=1872 (28th July)], construction work begins on Fort de la Malmaison, on the heights to the north of the River Aisne, northeast of Soissons. Similarly on Fort de Condé-sur-Aisne above the confluence of the River Aisne and the River Vesle. This fort will feature in the September 1914 Aisne campaign, and survives today as a heritage museum [museum website]. Two further forts - Rozelier and d'Haudainville - are added to the outer ring of defences at Verdun [continues at 1881 ...]. [THREAD = WW1 PERMANENT FORTIFICATIONS]

********** COMPOUND ARMOUR IS INVENTED **********

1877 The Armour Race [II - Compound Armour]: [...] Continued from 1876] Still loyally working on weapons of revenge, the Schneider Company [1876<>1889] at Le Creusot installs a 100-ton steam hammer for its heavy forging operations. The machine will remain in service until 1930 and still stands as a museum piece in Le Creusot town square [image]. Around the same time [Sir]1897 Alexander Wilson [Grace's Guide biography] at John Brown and Company [1863<>1888 (15th March)] demonstrates that freshly melted steel can be poured onto a prepared hot iron ingot and bond properly with it, giving a "compound armour". Cammell and Company [1863<>1903] achieve the same end by pouring fresh steel into the gap between heated iron and steel sheets. Both techniques aim, after rolling, to have steel as the surface third of the delivered plate, because it helps keep the plate from breaking up when struck. Around the same time Sir William Palliser [Wikipedia biography] devises "armour-piercing shot", that is to say, a solid or minimally hollowed out shot optimised during forging to penetrate an enemy's armour rather than produce a external blast [continues at 1889 ...]. [THREAD = THE WW1 FINANCIAL AND ARMAMENTS INDUSTRIES]

1877 The British artillery officer Frederick le Mesurier [no convenient biography] designs a 2.5" seven-pounder cannon capable of disassembly into mule-portable components for backwoods and mountain use. [THREAD = WW1 ARTILLERY]

1877 Thirteen acres of the ancestral Craiglockhart Estate, in the western suburbs of Edinburgh, are sold to the Craiglockhart Hydropathic Company [Wikipedia factsheet], in order to establish a curative spa. It will open for business in a purpose-built new mansion-hospital in 1880. [THREAD = WW1 MILITARY MEDICINE AND COGNITIVE SCIENCE]

1877 Built at John I. Thornycroft and Company [Wikipedia factsheet=>1892 (27th June)], Chiswick, HMS Lightning [Wikipedia shipography] enters service as the first seagoing vessel to be armed with Whitehead torpedoes [=1860]. She will spend her operational life at the torpedo warfare school at HMS Vernon [=1876]. [THREAD = THE WW1 SURFACE NAVIES]

1877 [not specifically dated] Zionism Pre-WW1 [II - Petah Tikva Founded]: [Continued from 1862] Helped by charitable funds from the French banker Baron Edmond de Rothschild [Wikipedia biography=>1882 (31st July)] the Hungarian farmer Yehoshua Stampfer [Wikipedia biography] draws together a consortium of like-mind Jews to create a Jewish settlement within Ottoman Palestine. They purchase land seven miles east of Tel Aviv and the first settlers arrive the following year. The name given to the new settlement is Petah Tikva [Hebrew = "Opening of Hope"; [map, etc.] [sub-thread continues at 1882 (1st January) ...]. [THREAD = THE BATTLE FOR HEARTS AND MINDS][THREAD = THE SHAPING OF THE MODERN WORLD]

1877 [1st January] The First Delhi Durbar: The Viceroy of India, Sir Edward Bulwer-Lytton [Wikipedia biography], attends Delhi's inaugural "Durbar" [Hindi = "celebratory reception, setting for same"] and proclaims Queen Victoria [1859 (27th January) <=1887 (20th June)] as the first "Empress of India" [=1876 (17th February)]. [THREAD = THE SHAPING OF WW1 EUROPE]

1877 [8th January] The Battle of Wolf Mountain: This battle is fought as part of the Great Sioux War [=1876 (8th February)] between Nelson A. Miles [=1876 (8th February)] column and a force of Lakota Sioux and Northern Cheyenne under Crazy Horse [=1876 (17th June)]. The outcome is a wise withdrawal by the Native Indians given their lack of modern rifles and artillery. [THREAD = THE SHAPING OF WW1 EUROPE]

1877 [29th January] HMS Foxhound [no convenient shipography] is the first warship to be launched at the Barrow Shipbuilding Company [=1871 <=1886]. [THREAD = THE WW1 SURFACE NAVIES]


ASIDE - SCHIESSLATZ MEPPEN IN WW1: Basically if a cannon had Krupp on the label and was manufactured between 1877 and 1945 then that weapon's prototyping had been done at Meppen. When not evaluating designs the site was also used to impress potential foreign buyers and (when he comes of age) Kaiser Wilhelm II himself (many times).

1877 [3rd March] The U.S. Army establishes a frontier fort at Fort Huachuca, AZ [map, etc.][Wikipedia factsheet=>1913]. [THREAD = THE SHAPING OF WW1 EUROPE]

ASIDE - FORT HUACHUCA IN WW1: During WW1 Fort Huachuca will be the base camp for the "buffalo soldiers" of the aforementioned 10th U.S. Cavalry Regiment [1846 (26th June) <=1898 (1st July)].


1877 [24th April-3rd March 1878] The Balkan Crisis [V - The Russo-Turkish War, 1877-1878]: [... Continued from 1876 (23rd December)] Following the collapse of the Constantinople
Conference [<=1876 (23rd December)], this 10-month war is fought in the Balkans and the Caucasus between an ailing Ottoman Empire and an expansionist Tsarist Russia. As with the Crimean War [<=1854 (28th March)], one of the casi belli was ongoing Ottoman persecution of its Orthodox Christian enclaves, not least the one in Bulgaria [<=1876 (20th April)]. But Russia was also still smarting at the peace terms imposed on it at the end of the Crimean War [<=1856 (Treaty of Paris)], and eager to turn anti-Turkish sentiment in the Balkans to its own advantage. Here is the main event ...

The Siege of Plevna, 1877

The war will be brought to an end by the Treaty of San Stefano [=>1878 (3rd March)], and successfully engineers independence for (and accordingly greater Russian influence in) Romania, Serbia, Montenegro, and Bulgaria. Russia receives a number of Ottoman provinces in the Caucasus. The war will be closely followed elsewhere across Europe, and the electrical engineer George Forbes [Wikipedia biography] takes time off from his university work to act as war reporter for The Times [continues at 21st May ...]. [THREAD = THE SHAPING OF WW1 EUROPE]

1877 [21st May-19th January 1878] The Balkan Crisis [VI - The Romanian War of Independence, 1877-1878]: [...] Continued from 24th April] This war of national independence is fought as an adjunct to the Russo-Turkish War [<=24th April] between Romanian nationalists under Prince Charles of Hohenzollern-Sigmaringen [1866 (23rd February)<=1881 (15th March)] and the Ottoman Empire under Abdul Hamid II of Turkey [Wikipedia biography] [=1900 (1st May)]. The war will be brought to an end by the Treaty of San Stefano [=>1878 (3rd March)] and the outcome will be a Romanian victory [continues at 1878 (3rd March) ...]. [THREAD = THE SHAPING OF WW1 EUROPE]

1877 [9th July] Alexander Graham Bell [1876 (14th June)<=1878 (14th January)] now sets up the Bell Telephone Company [Wikipedia factsheet] in order to exploit his patents. The company sells its first two telephones for $20. [THREAD = WW1 SIGNALLING AND TELECOMMUNICATIONS]

1877 [20th July] The Siege of Plevna: This five-month siege takes place as part of the Russo-Turkish War [<=24th April]. It is fought between a Russian/Romanian army under Grand Duke Nicholas of Russia [Wikipedia biography] and a defending Ottoman army under Osman Pasha [Wikipedia biography]. The outcome is a slow and expensive Russian-Romanian victory. The battle is noteworthy in the present context (a) for demonstrating the value of cheap and quickly built trench-works and dugouts against an enemy bombardment, and (b) for demonstrating the value of repeating rifles against infantry in the open [Trenk (1997 online) reports that the Ottomans had purchased 5000 Winchester Model 1866 carbines and around 50 million rounds of ammunition].

RESEARCH ISSUE: Kidd (2006 online) asks why the defence of Plevna should have aroused such interest across the World, both as it happened and afterwards. There are, for example, 18 streets named after Plevna in Britain, and five townships of that name in North America (four in the USA and one in Canada). Some fights, it seems, attract a lot of cheering for the perceived "little guys"

ASIDE: Frederick von Herbert [no convenient biography] will recount his part in the conflict (as an infantry lieutenant in the Ottoman Army) in his book "The Defence of Plevna" (1911; 2013 full text online). The Turkish "success" will not go unnoticed amongst military theorists. George Sydenham Clarke [Wikipedia biography] [=1882 (11th July)] covers in in detail in his 1890 monograph on "Fortification" [full text online]. Rogers (1975) will note an interesting technical side-effect of the campaign, as follows ...
"A revolution in the type of ordnance used in the field owed its origin apparently to the very effective head cover introduced by the Turks during their gallant defence against the Russians in the war of 1877. The Russian guns were quite ineffective against it and, as a result, similar protection for infantry manning defensive works came much into favour in many armies. The counter to it seemed to be in arranging a steep angle of descent for the projectile, which implied a return to the howitzer. In the days of [smooth-bore] ordnance, with its limited range, all field batteries had both guns and howitzers, but the latter had dropped out of use with the introduction of rifled pieces. Now there appeared to be a need for a rifled howitzer. To meet this need, the William Armstrong Company [1876 (8th May)<=>1881], Elswick, Newcastle-upon-Tyne produced a 12-cm [breech-loading] howitzer mounted on a field carriage of the ordinary travelling type and with a steel recoil cylinder. [...] The first field howitzer batteries were organised in 1896 and equipped with 5-in. howitzers, mounted on the above carriage, while siege trains were provided with a heavier 6-in. howitzer on a static mounting" (op. cit., p114).

1877 [24th September] The Battle of Shiroyama: This battle takes place during the Satsuma Rebellion [Wikipedia factsheet] between an Imperial Japanese army of some 30,000 troops under Prince Yamagata Aritomo [Wikipedia biography] and the 500 surviving samurai of the rebellion under Saigo Takamori [Wikipedia biography]. The outcome is an expensive government victory. The battle is noteworthy in the present context as a fight-to-the-last-man encounter. [THREAD = THE PSYCHOLOGY OF WAR]


1878 George M. Beard [1869<=>1880] publishes a paper entitled "Remarks on 'Jumpers or Jumping Frenchmen'" in which he describes a curious form of exaggerated tic syndrome which has been afflicting a community of French lumberjacks in the backwoods of Maine. Around the same time the German neurologist Adolph Kussmaul [Wikipedia biography] publishes a paper entitled "Die Störungen der Sprache" [in English as 'Disturbances of Speech'], in which he includes a still-useful diagram of the mind's processing hierarchy for communication [details in the Companion Resource]. Around the same time the French neurologist Jean-Martin Charcot [Wikipedia biography=>1882] publishes "Leçons sur les Maladies du Système Nerveux" [full French text online] [in English (1889) as "Clinical Lectures on Diseases of the Nervous System" - full English text online], in which he cross-correlates the neurological and muscular aspects of progressive muscle-wasting diseases such as Parkinson's disease, multiple sclerosis, and amyotrophic lateral sclerosis. [THREAD = WW1 MILITARY MEDICINE AND COGNITIVE SCIENCE]


1ASIDE: The jumping is believed nowadays to be a variant form of Tourette's Syndrome [Wikipedia factsheet]. In the event the (then-as-now) highly regarded Charcot will do much to promote Beard's career by adopting many of the American's ideas concerning neurasthenia. Historical discussion of these events is presently led by the Rush University Medical Centre's Christopher G. Goetz [academic homepage].

1878 Hysteria [I - Lasègue (1878)]: The French psychiatrist Charles Lasègue [Wikipedia biography] publishes a paper entitled "Des Hystéries Périphériques" [= "On Peripheral Hysterias"] in which he describes cases of "hysterical anaesthesia", that is to say, the inability to feel stimulation of areas of one's own body without good physical reason. He also predicts that "the definition of hysteria has never been given and never will be
[because] the symptoms are not constant enough, nor sufficiently similar in form or equal in duration and intensity" (cited in Showalter, 1997, p14). [THREAD = WW1 MILITARY MEDICINE AND COGNITIVE SCIENCE]

ASIDE: Compare Lasègue's position with the comment by Thomas Willis two centuries previously [<=1684]. A peripheral hysteria is one which is characterised by an apparent and patient-reported inability either to feel or control a limb.

1878 George Garrett [1877<=>1879 (26th November)] builds Resurgam I, a 14-feet long hand-cranked experimental submarine weighing less than five tons. [THREAD = THE WW1 SUBMARINE NAVIES]

ASIDE: Resurgam is the Latin for "I shall arise again". Not all who will serve in submarines do.

1878 The American inventor Thomas A. Edison [Wikipedia biography]=>1880 (13th February)] invents the "phonograph", a machine for recording speech and music. [THREAD = THE INDUSTRIAL AND SCIENTIFIC REVOLUTION]

********** "JINGOISM" IS BORN **********

1878 The British music hall performer Gilbert H. MacDermott [Wikipedia biography] pays a guinea to George W. Hunt [no convenient biography] for a song entitled "The Dogs of War" [full text and audio online]. The lyric includes the catchy chorus "We don't want to fight, but by jingo if we do, we've got the ships, we've got the men, and got the money too". It will be the public house anthem of the year amongst Britain's working class patriots. [THREAD = WW1 JINGOISM]

1878 [14th January] Alexander Graham Bell [1877 (9th July)] personally demonstrates his telephone apparatus to Queen Victoria [1877 (1st January)<=>1887 (20th June)]. At much the same time the American inventor David E. Hughes [Wikipedia biography] invents the carbon-granule microphone [Wikipedia factsheet]. Around the same time, the Bell Telephone Company [1877 (9th July)<=>1880 (20th March)] opens its first telephone exchange at New Haven, CT. For the next 20 years users have to gain the exchange operator's attention by hand-cranking a signal generator, before naming the party they wish to be put through to. [THREAD = WW1 SIGNALLING AND TELECOMMUNICATIONS]

********** THE FIRST SELF-PROPELLED TORPEDO KILL **********

1878 [16th January] Having been assigned by the Imperial Russian Navy to the Black Sea to oversee conversion of the civilian steamer Velikiy Knyaz Konstantin [Wikipedia shipography] into an experimental torpedo boat tender carrying four small steam torpedo boats, Stepan Makarov [Wikipedia biography] now mounts history's first self-propelled torpedo attack, sinking the Ottoman gunboat Intibah [no convenient shipography]. [THREAD = THE WW1 SURFACE NAVIES]


********** BULGARIA IS STILLBORN **********

1878 [3rd March] The Balkan Crisis [VII - The Treaty of San Stefano]: [... Continued from 1877 (21st May)] This attempted treaty between the Russian and Ottoman Empires brings the Russo-Turkish War [<=1877 (24th April)] to an end. The main provision is that Bulgaria is proposed as a (pro-Russian) independent province - "Greater Bulgaria" - after 500 years of Ottoman rule. As things turn out, however, this proposal is immediately
blocked by France and Britain as being far too advantageous to Russia, and further negotiations duly take place [continues at 13th June ...]. [THREAD = THE SHAPING OF WW1 EUROPE]

1878 [13th March] Inspired by the MacDermott-Hunt popular song [<=1878], the British politician George Holyoake [Wikipedia biography] has a letter published in the Daily News under the tagline "The Jingoes in the Park". The term "jingoism" soon catches on, and comes to describe the sort of loud rote-learned unthinking patriotism of the common man, and - by implication - the politicians and press pundits who pander to them. [THREAD = WW1 JINGOISM]

RESEARCH ISSUE - THE APPEAL OF JINGOISM: Anecdotally there is little doubt that humankind is shamefully susceptible to the thrills of jingoism. Scientifically, however, there is no single theory as to the inner dynamics of the phenomenon.

1878 [9th April] The Factory and Workshop Act, 1878: The British Parliament passes an Act extending existing employment legislation to all trades and all children under 10 years of age. [THREAD = THE WW1 WORKING CLASS SOLDIER]

1878 [?7th May] Following their joint experimentation at the Blaenavon Iron and Coal Works [1875<=1880] Sidney G. Thomas [<=1875] and Percy Gilchrist [<=1875] patent a phosphorus-removal technique for use during Bessemer Conversion. The essence of the so-called "Thomas-Gilchrist Process" process is to pre-line the Bessemer Converter with sacrificial lime-rich brickwork, which then acts to leach any phosphorus impurities out of the melt in the form of a "basic slag". It follows that phosphorus-contaminated iron ore suddenly becomes far more valuable, with the aforementioned Andrew Carnegie [1875 (22nd August)<=1883 (29th August)] one of many to purchase production rights. The inventors present their technique to a meeting of the Iron and Steel Institute in May 1879. [THREAD = THE INDUSTRIAL AND SCIENTIFIC REVOLUTION]

1878 [1st June] The Tay Bridge: After seven years in the construction, a new two-mile-long iron railway bridge is opened across the River Tay [continues at 1879 (28th December) ...]. [THREAD = THE SHAPING OF WW1 EUROPE]

********** BULGARIA IS BORN **********

1878 [13th June-13th July] The Balkan Crisis [VIII - The Congress and Treaty of Berlin]: [... Continued from 3rd March] The German Chancellor Otto von Bismarck [1873 (23rd October)<=1888 (15th June)] leads diplomats from across Europe in discussions to help stabilise the situation in the Balkans (without giving too much away to the Russians). The main points of agreement are (a) Romania, Serbia, and Montenegro are confirmed as independent nations, (b) Russia gets to keep Bessarabia, (c) Bulgaria is to be split into Bulgaria and Rumelia, (d) the Ottomans get to keep Macedonia, and (e) (much to the irritation of the Russians) Bosnia and Herzegovina are ceded to Austria-Hungary but remain occupied by the Ottomans [continues at 29th July ...]. [THREAD = THE SHAPING OF WW1 EUROPE]

1878 [29th July-20th October] The Balkan Crisis [IX - The Invasion of Bosnia-Herzegovina, 1878]: [... Continued from 13th June] Under authority granted by the Treaty of Berlin [<=13th June], Austria-Hungary conducts a brief but fiercely contested police action against Muslim partisans in Bosnia and Herzegovina, occupying Sarajevo and Mostar, their respective capitals [continues at 1881 (15th March) ...]. [THREAD = THE SHAPING OF WW1 EUROPE]

ASIDE - BOSNIA-HERZEGOVINA IN WW1: This aspect of Balkan history will be addressed in due course.
The Pontypridd, Caerphilly, and Newport Railway [I - The Initial Authorisation]: The owners of the Alexandra Docks, Newport are given the go-ahead to build a new railway line to link the Rhondda Valley coalfields directly to Newport rather than travel via Cardiff (this route being both congested and expensive per ton) [continues at 1884 (25th July) ...]. [THREAD = THE SHAPING OF WW1 EUROPE]

The Second Anglo-Afghan War, 1878-1880: This war of imperial confrontation by proxy is fought between Britain and Afghanistan in an attempt to "defend" the latter against Russian influence from the north. The British advance north-westward out of India in three separate columns under (1 - Peshawar, Khyber Pass, Ali Musjed, Jajalabad, Kabul from the east) Samuel Browne [Wikipedia biography], (2 - Peshawar, Khost Valley, Shutargardan Pass, Kabul from the south) [Sir] Frederick S. Roberts ("Bobs") [Baron Roberts of Kandahar] [1889 [Earl Roberts]], and (3 - Quetta, Kandahar) [Sir] Donald M. Stewart [Wikipedia biography]. The Afghans are led by Sher Ali Khan [Wikipedia biography]. The war then unfolds in two main phases, separated by the early, but to most Afghans unacceptable, Treaty of Gandamak. Here are the main events, phase by phase ...

**PHASE ONE**
The Early Advances, 1879; The Ford of Kabul Affair, 1879; The Kabul Massacre, 1879; The Battle of Charasiah, 1879; The Treaty of Gandamak, 1879

**PHASE TWO**
The Battle of Maiwand, 1880; The Siege of Kandahar, 1880; The Evacuation of Kabul/The March on Kandahar, 1880; The Battle of Kandahar, 1880

The overall outcome of the war is a British victory and a for-the-time-being compliant Afghan administration under Abdur Rahman Khan [Wikipedia biography]. [THREAD = THE SHAPING OF WW1 EUROPE]

********** THE LEE MAGAZINE SYSTEM IS BORN **********

James Paris Lee [1861 <~ 1885 (Remington-Lee) / 1895 (Lee-Enfield)] now patents a spring-loaded *en bloc* magazine and incorporates it with an ergonomically sound bolt action for his latest prototype rifle [continues at 1885 (Remington-Lee) ...]. [THREAD = WW1 SMALL ARMS]

1500 workers are laid off at the Melingriffith Tinplating Works [1810 <~ 1887], Cardiff, due to adverse trading conditions. [THREAD = THE WW1 WORKING CLASS SOLDIER]

Drawing on his experiences as a Union Brigadier-General in the American Civil War [<=1863 (17th April)] the banker John Beatty [Wikipedia biography] publishes "The Citizen-Soldier, or, Memoirs of a Volunteer" [Project Gutenberg full text online], a detailed diarised account of his time with the Third Ohio Battalion. The work is full of valuable anecdotes from a civilian suddenly finding himself leader of men. Here is what he has to say about music in his camp ...

"The parson [...] stumbles on a strain of "Sweet Home," then a scratch of "Lang Syne;" but the latter soon breaks its neck over "Old Hundred," and all three tunes finally mix up and merge into "I would not live alway, I ask not to stay," which, for the purpose of steadying his hand, the parson sings aloud. [...] Willis then] plays a very fine thing, and when I ask what it is, replies: "Norma, an opera piece [probably the haunting Casta Diva aria - *hear it now!*]." Since the parson's exit he has been executing "Norma" with great spirit, and, so far as I am able to judge, with wonderful skill[... It ] goes far to carry one out of the wilderness." [THREAD = WW1 TRENCH ENTERTAINMENT]
1879 The German physician-physiologist-psychologist **Wilhelm Wundt** [Wikipedia biography] sets up an experimental psychology laboratory at Leipzig University. [THREAD = WW1 MILITARY MEDICINE AND COGNITIVE SCIENCE]

1879 The brothers **George Cadbury** [Wikipedia biography] and **Richard Cadbury** [Wikipedia biography] open a cocoa products factory on a green-fields site at what is now Bourneville [map, etc.], Birmingham. Working with the architect **George H. Gadd** [no convenient biography] they develop the site as their "factory in a garden", complete with an attached "model village" (later a "garden city"). Around the same time the American soap manufacturers **Procter and Gamble** [modern corporate website] introduce a floating soap under the brand-name "Ivory". [THREAD = THE SHAPING OF WW1 EUROPE]

1879 **Ludwig Nobel** (1876<=1888 (12th April)) and **Robert Nobel** (<=1876) expand their oil refining business (<=1876) as the **Branobel Company** [Wikipedia factsheet] expand their oil refining business (<=1876). [THREAD = THE WW1 FINANCIAL AND ARMAMENTS INDUSTRIES]

1879 [2nd January] While undertaking gunnery practice in the Sea of Marmara, **HMS Thunderer** (1876 (14th July)<=scraped 1909) suffers a massive turret explosion, killing 11 of her crew [see the wreckage]. [THREAD = THE WW1 SURFACE NAVIES]

**ASIDE:** It emerged at the Committee of Inquiry that the explosion was the result of some confused safety checking during the reloading procedure. Specifically, a misfire in the left hand gun was not detected, leading to a second round being loaded on top of the first [see explanatory diagram]. The affair was discussed in Parliament 17th March 1879, and duly recorded in Hansard [full text online].

**ASIDE - THE RELOADING PROCEDURE:** Some idea of the complexities involved in reloading large turreted muzzle-loading ordnance can be gained from the following *Hansard* extract ...

"Now, in the first place, it is necessary, in order that the House may appreciate the Report of the Committee, that I should state very shortly the nature of the arrangements for working the guns and the general arrangements on board the ship. My Lords, the ship is a vessel with two turrets, and in each turret there were two guns. In the after turret of the ship the guns were 35 tons; but in the forward turret there were 38-ton guns. These larger guns, being of the length of 16 feet 6 inches, it was impossible to load them in the turret, and arrangements were made to draw in the guns from their position, and lower or depress the muzzle, so that they might be loaded from the battery deck. In addition to this, there was an arrangement to wash out, as well as load, the guns by hydraulic power; and there was also a contrivance that when the rammer which, made like a telescope in two joints, had reached the breach of the gun, it should indicate that the washing was completed, so that it might be known to the crew if the gun was not properly washed out. [...] Now, my Lords, permit me to call your Lordships' attention to the failures which took place in reference to the gun. First of all, the electrical appliances failed to fire the guns; then the men above failed to see after the first firing that the gun had not recoiled; then the men below, who had still more important duties to perform, failed to see that the gun was not properly washed out; the telescope rammer failed to ram, the indicator failed to indicate. Such, my Lords, were the failures connected with the loading of the gun".

**GENERAL RESEARCH ISSUE:** This is a good point at which to consider the problems arising when carrying out complex technical procedures in times of combat stress. Three highly technical areas of cognitive science are involved, two of them theoretical, and the third practical ...

**RESEARCH ISSUE (1) - PROCEDURAL MEMORY:** See the entry in Companion Resource.

**RESEARCH ISSUE (2) - COGNITIVE OVERLOAD:** See Companion Resource.
RESEARCH ISSUE (3) - BAULKING: A “baulk” in mechanical engineering is a physical obstacle to a particular undesirable control operation taking place in certain circumstances (thus it is generally impossible to select DRIVE on an automatic gearbox without simultaneously putting your foot on the brake pedal, or REVERSE when moving forwards, etc., etc). Baulking is good practice for all complex systems because “if it can go wrong it will go wrong”; unfortunately the baulks themselves add weight and complexity to the host system so it is not generally possible to baulk against every eventuality. On the occasion described above, the baulks on the ramming system seem to have been insufficient, or -where installed but faulty- had not "failed safe". The modern science of the safe human operation of complex systems is "cognitive ergonomics" [Wikipedia factsheet].

1879 [2nd January] The Early Advances: The British open the Second Anglo-Afghan War [<=1878 (20th November)] with a three-pronged advance across the Hindu Kush mountains. In the north, Samuel Browne [=1878 (20th November)] takes his forces up through the Khyber Pass, capturing the fortresses of Ali Masjid and Jalalabad. 70 miles to the west [Sir]1879 Frederick S. Roberts ("Bobs") [Baron Roberts of Kandahar]1892 [Earl Roberts]1901 [1878 (20th November)<=3rd September] takes his forces up the Kurram Valley, defeating a strong Afghan army at Peiwar Kotal and then following the pass in its natural west-then-north dogleg toward Kabul. And 300 miles further still to the southwest [Sir]1880 Donald M. Stewart [1878 (20th November)<=1880 (8th August)] takes his force through the Bolan Pass to Quetta and thence through the Khojak Pass to Kandahar. [THREAD = THE SHAPING OF WW1 EUROPE]

1879 (11th January-4th July) The Anglo-Zulu War, 1879: This war of imperial expansion is fought between a British taskforce under Sir Henry Bartle Frere, 1st Baronet [Wikipedia biography], Frederic Thesiger, 2nd Baron Chelmsford [Wikipedia biography=22nd January], and [Sir]1885 Garnet Wolseley [1st Viscount Wolseley]1885 [1873 (7th March)<=1882 (1st April)], and the dissident Zulu nation under its king Cetshwayo [Wikipedia biography]. The most notable engagements are ...

The Battle of Isandhlwana Hill, 1879; The Battle of Rorke's Drift, 1879; The Battle of Ulundi, 1879

The overall outcome is a British victory, two-one. [THREAD = THE SHAPING OF WW1 EUROPE]


1879 [22nd January] The Battle of Isandlwana Hill: This battle is fought as part of the Anglo-Zulu War [=11th January] between a British column under Frederic Thesiger, 2nd Baron Chelmsford [11th January<=4th July] and the Zulu National Army under Ntshingwayo Khoza [Wikipedia biography]. The outcome is the total annihilation of the British column. The story is told in greater detail in our Companion Resource. One of the few British survivors of the massacre is a young lieutenant named Horace L. Smith-Dorrien [Wikipedia biography=1914 (21st August)], of whom more later. [THREAD = THE SHAPING OF WW1 EUROPE]

WAR VIDEO: This is the battle dramatised in Douglas Hickox' (1979) movie "Zulu Dawn" [see clip now].

1879 [22nd-23rd January] The Battle of Rorke's Drift: This battle is fought as a follow-on engagement to the Battle of Isandlwana Hill [=above] between the Zulu army, fresh from its earlier victory, and the garrison at the mission station at Rorke's Drift. The
outcome is a spirited defence followed by a Zulu withdrawal. [THREAD = THE SHAPING OF WW1 EUROPE]

**WAR VIDEO:** This is the battle dramatised in Cy Endfield's (1964) movie "Zulu" [see indicative clip now].


1879 [21st February] Upon the death of Sher Ali Khan [<=1878 (20th November)] his title passes to his son Mohammad Yaqub Khan [Wikipedia biography => 3rd September]. [THREAD = THE SHAPING OF WW1 EUROPE]

1879 [31st March] **The Ford of Kabul Affair:** This event takes place as part of the first phase of the Second Anglo-Afghan War [<=1878] when a British column attempts to ford the Kabul River at Kalai Sak, some 70 miles east of Kabul itself. Unfortunately the ford is poorly marked and 46 troopers are swept away and drowned. [THREAD = THE SHAPING OF WW1 EUROPE]

**ASIDE - WAR POETRY:** This event will be written up in Rudyard Kipling's (1890) poem "Ford o' Kabul River" [full text].

1879 [24th April] Upon the death of the coal-owner Samuel Thomas [<=1872] his assets pass to his eldest son David A. Thomas [1st Viscount Rhondda] [1887]. For the time being, however, he will leave the day-to-day running of the Cambrian Colliery [1872 => 1908] to its managers. [THREAD = THE WW1 FINANCIAL AND ARMAMENTS INDUSTRIES]

1879 [10th May] Upon the death of the ironmaster Robert Thompson-Crawshay [<=1874] his estate is valued at £1.2 million and responsibility for the Cyfarthfa Ironworks [1874 => 1902] passes to his sons William Crawshay III [no convenient biography], Robert Crawshay II [no convenient biography], and Richard Crawshay [no convenient biography], who, trading as Crawshay Brothers (Cyfarthfa) Limited [no convenient factsheet => 1902], now invest in five new blast furnaces and four Bessemer Converters to upgrade their works from iron to steel manufacture. [THREAD = THE WW1 WORKING CLASS SOLDIER]

1879 [26th May] **The Treaty of Gandamak:** This treaty between Britain and Afghanistan brings the first phase of the Second Anglo-Afghan War [<=1878 (20th November)] to an end. Unfortunately its main provision - that the Afghan regime should henceforth conduct its foreign affairs subject to British scrutiny and approval - is not acceptable to many Afghans and they soon take steps to rid themselves of the British Residency in Kabul [=> 3rd September], occasioning a further 15 months of fighting. [THREAD = THE SHAPING OF WW1 EUROPE]

********** MACHINE GUNS GO TO WAR AGAIN **********

1879 [4th July] **The Battle of Ulundi:** This battle is fought as part of the Anglo-Zulu War [<=11th January] between the main British column (complete with artillery and two Gatling Guns) under Frederic Thesiger, 2nd Baron Chelmsford [<=22nd January] and a much larger Zulu army under Ziwedu kaMponde [no convenient biography]. The outcome is a decisive British victory. [THREAD = THE SHAPING OF WW1 EUROPE]

1879 [18th July] The new Cambridge Military Hospital [Wikipedia factsheet], Aldershot Garrison, opens for patients. [THREAD = WW1 MILITARY MEDICINE AND COGNITIVE SCIENCE]
ASIDE - CAMBRIDGE MILITARY HOSPITAL IN WWI: Aldershot will be the first war hospital to receive casualties repatriated from France, and will spearhead the development of plastic surgery techniques for battle injuries.

1879 [3rd September] The Kabul Massacre: This massacre ushers in the second phase of the Second Anglo-Afghan War [<=1878 (20th November)]. The casualties are the British Governor, Sir Louis Cavagnari [Wikipedia biography] and around 75 members of his entourage. When the news reaches Peshawar Sir Frederick S. Roberts ("Bobs") [Baron Roberts of Kandahar]1892 [Earl Roberts]1901 [2nd January<=6th October] mobilises an army of punishment and advances toward Kabul. Suspected of complicity in the massacre Mohammad Yakub Khan [<=21st February] is stripped of his throne and sent into exile [continues 6th October ...]. [THREAD = THE SHAPING OF WW1 EUROPE]

1879 [6th October] The Battle of Charasiab: [... Continued from 3rd September] This battle takes place as part of second phase of the Second Anglo-Afghan War [<=1878] between the Kabul Field Force under Sir Frederick S. Roberts ("Bobs") [Baron Roberts of Kandahar]1892 [Earl Roberts]1901 [3rd September] and a significantly larger Afghan army under Nek Mohammed Khan [no convenient biography]. It takes place seven miles south of Kabul and results in a significant British victory, followed by the occupation of that city. [THREAD = THE SHAPING OF WW1 EUROPE]

1879 [7th October] The League of the Three Emperors [III - The Dual Alliance]: [... Continued from 1873 (23rd October)] Germany and Austria-Hungary sign a mutual defence treaty, in which they agree to assist each other should either party be attacked by Russia, or remain neutral at worst should either be attacked by "any other power" (meaning France) [continues at 1881 (18th June) ...]. [THREAD = WW1 TREATIES AND ALLIANCES]

1879 [26th November] George Garrett [<=1878] builds Resurgam II, a 45-foot-long steam-powered submarine. It sinks in an accident on 25th February 1880, but not before it has attracted a lot of interest. [THREAD = THE WW1 SUBMARINE NAVIES]

ASIDE: The wreck of Resurgam II was located in 1995 and may one day be raised. A replica is on show at the Woodside Ferry Terminal, Birkenhead, across from the U-534 Submarine Museum [museum website].

1879 [28th December] The Tay Bridge Disaster: After only 18 months in operation the new Tay Bridge [<=1878 (1st June)] collapses under the combine stresses of a passing train and lateral wind gusts estimated at 80 mph. All 75 passengers and crew are killed. [THREAD = THE SHAPING OF WW1 EUROPE]


1880 The British archaeologist Flinders Petrie [Wikipedia biography]1892 studies construction methods at the Great Pyramid of Giza. [THREAD = PRE-WW1 INTELLECTUAL RIVALRY]
1880 Neurasthenia [III - Beard (1880)]: [...] Continued from 1875] George M. Beard [1878<=1881]
now further expands his theory of neurasthenia with an article entitled "American Nervousness, with its Causes and Consequences", in which he proposes an energy flow metaphor to explain the relationship between "nervous energy" and a person’s ability to cope with the stresses and strains of life in the increasingly frenetic 19th century [continues at 1881 ...]. [THREAD = WW1 MILITARY MEDICINE AND COGNITIVE SCIENCE]

1880 Meister, Lucius and Company [=1863 (2nd January)] go public under the name Farbwerke Hoechst, A.G. [modern corporate website], and specialise in dyestuffs and related chemicals. Around the same time the recently widowed Mary K. Swan [née Glover] [no convenient biography] and [Sir]1918 George B. Hunter [Wikipedia biography] merge their respective shipbuilding businesses as C. S. Swan, Hunter, and Company [Wikipedia factsheet=>1903], Tyneside. [THREAD = THE WW1 FINANCIAL AND ARMAMENTS INDUSTRIES]

1880 [6th January] [...] Continued from 1876 (8th May)] The Caio Duilio [1876 (8th May)] enters service with the Royal Italian Navy. [THREAD = THE WW1 SURFACE NAVIES]


1880 [13th February] The Edison Effect: Thomas A. Edison [1878<=1881] takes out a protective patent on an electrical phenomenon he has noticed while improving his company's electric light bulbs. Specifically he has observed that a burned-out light bulb - one in which the anode and the cathode1 are no longer connected by the filament - will typically have eroded mostly at the cathode. Using a galvanometer he has also noted that there is a measurable flow of current between the two pins even without a filament - that is to say, through the vacuum between them. As with Frederick Guthrie's [=1873] earlier experiment, Edison's observations are now interpreted as another early example of the phenomenon of "thermionic emission" [=1873], this time through a vacuum, and this time as part of a recognisable circuit. [THREAD = BASIC PHYSICS] [THREAD = WW1 SIGNALLING AND TELECOMMUNICATIONS]

1ASIDE - CATHODE, ANODE, ETC.: Readers unfamiliar with basic D.C. circuit terminology may care to divert to this Northwestern University tutorial on the subject (for beginners). To cut a long story short, all chemical batteries create two "poles", the first, known as the "cathode", where there is an excess of negatively charged particles known as "electrons", one of whose properties is that they do not like being close to other like-charged particles. They therefore do their best to migrate away from the cathode, in this instance to the other pole created by the battery - the "anode" - where there is a comparative shortage of electrons. The difference in charge between the two poles determines the "voltage", or "potential difference", between them. Unfortunately for Edison the electron and its most important commercial applications will not be discovered for another 17 years [=1897 (30th April)].

1880 [20th March] The Bell Telephone Company [=1878] is re-incorporated as the American Bell Telephone Company [=1882]. [THREAD = WW1 SIGNALLING AND TELECOMMUNICATIONS]

1880 [25th March] Following the death of Susan Elliott [=1873 (18th January)] her business partner Willoughby Smith [1873 (18th January)<=1890 (17th July)] becomes the driving force behind Elliott Brothers [1876<=1890 (17th July)], but chooses to retain the Elliott name. Around the same time his sons William O. Smith [Grace's Guide biography=>1890 (17th July)] and Willoughby
S. Smith [Grace's Guide biography=>1890 (17th July)] join the company. [THREAD = WW1 CYBERNETICS, COMPUTATIONAL SCIENCE, AND FIRE CONTROL] [THREAD = THE WW1 FINANCIAL AND ARMAMENTS INDUSTRIES]

********** IMPORTANT ARMY REORGANISATION **********
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1880 [28th April] With the Liberal Party re-elected, Hugh Childers [Wikipedia biography] is appointed Secretary for War, with a brief to rationalise the British Army's regimental structure following the earlier Cardwell Reforms [=1870 (3rd March)]. The result is the "Childers System", where most regiments are identified by their county/city of origin and field two substantive battalions (so that they can routinely be rotated between foreign and home deployment) and maintain two reserve battalions. [THREAD = WW1 ARMIES, TRADITIONS, AND TACTICS]


1880 [13th May] The competing British telephone companies, namely the Telephone Company Limited [=1876 (14th June)] and the Edison Telephone Company London Limited [=1876 (14th June)] decide to fight no longer and merge to form the United Telephone Company [Grace's Guide factsheet=>1889 (1st May)]. [THREAD = THE SHAPING OF THE MODERN WORLD]

1880 [27th July] The Battle of Maiwand: This battle takes place as part of the second phase of the Second Anglo-Afghan War [=1878] between a British column under George Burrows [Wikipedia biography] and a much larger Afghan army under Mohammad Ayub Khan [Wikipedia biography=>28th July]. The Afghans have decided to threaten Kandahar with a large reserve force previously stationed in the north-east of their country around Herat, and thereby to outflank the British forces at Kabul. Burrows, not fully realising either his enemy's strength or the quality of their troops, has advanced to stand across their line of advance. The outcome is a major Afghan victory, with the British survivors being driven back into the fortifications at Kandahar. The expedition is noteworthy in the present context for the well-executed rear-guard covering action by a troop of Royal Horse Artillery under John R. Slade [no convenient biography]. The battle is also famously where the (fictitious) army surgeon John H. Watson [Wikipedia biography] is wounded in the shoulder. [THREAD = THE SHAPING OF WW1 EUROPE]

1880 [28th July-31st August] The Siege of Kandahar: This five week siege is fought out as part of the second phase of the Second Anglo-Afghan War [=1878 (20th November)] between a besieging Afghan army under Mohammad Ayub Khan [27th July<=1st September] and the British garrison at Kandahar under James Primrose [no convenient biography]. The defenders manage to hold out until a relief column arrives on 1st September [continues at 8th August ...]. [THREAD = THE SHAPING OF WW1 EUROPE]

1880 [7th August] Mapperley Hospital [Nottingham University factsheet], Nottingham, accepts its first patients. [THREAD = WW1 MILITARY MEDICINE AND COGNITIVE SCIENCE]

1880 [8th August] The Evacuation of Kabul/The March on Kandahar: This evacuation takes place as part of the second phase of the Second Anglo-Afghan War [=1878 (20th November)]. Commanded now by [Sir]Donald M. Stewart [=1879 (2nd January)], the British have now decided to pull all their forces out of Afghanistan back into India, there to await political developments. However their garrison at Kandahar is still under siege. They therefore despatch a relief column under Sir Frederick S. Roberts ("Bobs") [Baron Roberts of Kandahar] [=1879 (6th October)] and Earl Roberts [1901]
September] to force march the 300 miles to Kandahar, while Stewart leads the remaining forces back into India through the Khyber Pass. [THREAD = THE SHAPING OF WW1 EUROPE]

1880 [1st September] The Battle of Kandahar: This battle takes place as part of the second phase of the Second Anglo-Afghan War [=1878] between the British relief column under Sir Frederick S. Roberts ("Bobs") [Baron Roberts of Kandahar][1892 [Earl Roberts][1901 [8th August]<=1899 (23rd December)] and the besiegers of Kandahar since 28th July under Mohammad Ayub Khan [=28th July]. The outcome is a decisive British victory and an end to organised Afghan resistance. The disputed Treaty of Gandamak [=1879 (26th May)] is now implemented by the British-approved Abdur Rahman Khan [1878 (20th November)<=1901 (1st October)], who will rule strongly for a further 20 years. [THREAD = THE SHAPING OF WW1 EUROPE]

1880 [4th October] After five years of post-launch specification changes HMS Superb [1875 (16th November)<=1882 (11th July)] is finally accepted into service. As commissioned she mounts 16 10" [=254mm] rifled muzzle-loaders. [THREAD = THE WW1 SURFACE NAVIES]

********** PSYCHOTHERAPY BY INTERACTION IS BORN **********


1ASIDE: Pappenheim was (and still is) discussed pseudonymously as "Anna O". For want of a better idea, Breuer engaged her in his experimental "talking cure" (the patient's own description of the treatment), an early form of hypnosis-assisted psychoanalysis. What he did was to note down recurring thoughts from the patient's ramblings during a hysterical attack, and then to give her the opportunity after the attack had subsided to explore the deeper memory structures those themes might happen to be associated with. For example, after a period in which she refused to drink normally, a memory surfaced of an occasion when she had been sickened at the sight of a lapdog being allowed to drink from its mistress' glass. This mere act of recollection then seemed to dissolve the behavioural block. Anna O was eventually written up over a decade later as "Case 1 (Breuer)" in the chapters which Breuer contributed to the collaborative "Studies in Hysteria" (Freud and Breuer, 1895/1955) [=1895]. For more detail see the Companion Resource.


1880 [16th December-23rd March 1881] The First Anglo-Boer War, 1880-1881: This war of colonial resistance is fought between the South African Republic (colloquially "the Transvaal", or "the Boers") and Britain. The main event is ...

The Battle of Majuba Hill, 1881

The overall outcome is a Boer victory. [THREAD = THE SHAPING OF WW1 EUROPE]

1880 [20th December] The British High Court decides that insofar as existing telegraphy law is concerned telephony is just a subcategory of telegraphy, and therefore subject to the same rules and regulations. The sticky end of this judgement is that the new telephone companies henceforth have to buy government licences. [THREAD = THE SHAPING OF THE MODERN WORLD]

1881 Having witnessed a man accidentally electrocuted by one of the early commercial A.C. supply systems the American dentist Alfred P. Southwick [Wikipedia biography]
contacts the politician David B. Hill [Wikipedia biography] (later New York State Governor) and together they begin to lobby for electrocution as a humane form of execution. The State of New York agrees to set up an investigative committee to look into the matter [continues at 1888 ...]. [THREAD = THE SHAPING OF THE MODERN WORLD]

1881 The German entrepreneur Emil Rathenau [Wikipedia biography] starts to acquire licences from Thomas A. Edison [1880 (13th February)<=>1884 (6th June)] to manufacture the latter's highly innovative electrical consumer products [continues 1887 ...]. [THREAD = THE WW1 FINANCIAL AND ARMAMENTS INDUSTRIES]

1881 Charles De Bange [1872<=>1882] starts to deliver his latest offering from the Paris Arsenal, namely a 155mm [= 6.1"] Breech-Loading Howitzer [Wikipedia factsheet]. [THREAD = WW1 ARTILLERY]

1881 Brunner, Mond, and Company [1873<=>1912] is reorganised as a limited liability company and enters a period of steady growth. [THREAD = THE WW1 FINANCIAL AND ARMAMENTS INDUSTRIES]

1881 Neurasthenia [IV - Beard (1881)]: [... Continued from 1880] George M. Beard [1880<=>1884] now further develops his 1880 theory of neurasthenia with a full-length monograph entitled "American Nervousness - Its Causes and Consequences" [full text online], in which he explores what "nervousness" - "a lack of nerve force" - might be and attempts to demonstrate that it has been lately increasing in prevalence [continues at 1884 ...]. [THREAD = WW1 MILITARY MEDICINE AND COGNITIVE SCIENCE]

1881 The U.S. civil service statistician John S. Billings [no convenient biography] looked at the clerks patiently entering data from 1880 census returns and reputedly remarked: "There ought to be some mechanical way of doing this job, something on the principle of the Jacquard loom" (Cortada, 1993, p47). Around the same time the Spanish inventor V. Ventosa devises the "Ventosa Integrator" [see Clymer (1993 online; Figure 4) for diagram] for computing the components of wind velocity. The functional components are a sphere, a pivotable driving wheel angled to and by the present wind direction, and four driven output rollers. The Ventosa Integrator is another early example of a class of mechanical device which will go on to be termed "analog computers". [THREAD = WW1 CYBERNETICS, COMPUTATIONAL SCIENCE, AND FIRE CONTROL]

ASIDE: We forewarn once again that technology such as Ventosa's will feature massively in the fire control systems of the Dreadnought era of naval warfare [=1901 (Arthur Pollen)].

1881 The Elswick 12-Pounders: Having had such weapons under evaluation for over 20 years [=1854/1865] the William Armstrong Company [1877 (20th July [ASIDE])<=>1882], Elswick, Newcastle-upon-Tyne finally receives a production order for a series of 12-pounder field and naval rifled breech-loaders. All use the "interrupted screw" breech-locking system to achieve "Q.F." [= "quick fire"] Status. [THREAD = WW1 ARTILLERY]

1881 Fortress France and Belgium [V - Verdun-Vaux]: [... Continued from 1877] As part of the Séré de Rivières upgrades [=1872 (28th July)], construction work begins on the Fort de Vaux [Wikipedia factsheet] [=1914 (11th September)], on the heights to the northeast of Verdun, about two miles east of the Fort de Douaumont [=1885]; also at Bois Bourrus, Moulainville, and Landrecourt. Vaux is nowadays a heritage museum [museum website] [continues at 1885 ...]. [THREAD = WW1 PERMANENT FORTIFICATIONS]
1881 [24th January or hereabouts] George Westinghouse Jnr [1873 (28th October)<=1886 (20th March)] establishes the Union Switch and Signal Company [Wikipedia factsheet] and starts to accumulate patents on railway switching and signalling equipment. [THREAD = THE SHAPING OF THE MODERN WORLD]

1881 [24th January] A young Serbian engineer named Nikola Tesla [Wikipedia biography] gets a job with the team building Budapest Telephone Exchange, and is rapidly promoted to Chief Electrician on the project. [THREAD = THE SHAPING OF THE MODERN WORLD]

**ASIDE:** We recommend John Forcina's *Tesla Universe* website for a fuller account of Tesla's contribution to the modern world.

1881 [27th February] The Battle of Majuba Hill: This battle is fought as part of the First Anglo-Boer War [<=1880 (16th December)] between a British column under Sir George Colley [Wikipedia biography] and a South African Republican militia column under Nicolaas Smit [Wikipedia biography]. The outcome is a British humiliation at the hands of the Boer irregulars. [THREAD = THE SHAPING OF WW1 EUROPE]

1881 [13th March] Alexander II of Russia [<=1863 (22nd January)] is assassinated by a political extremist group and his imperial throne passes to his son as Alexander III of Russia [1868 (6th May)<=1892 (17th August)]. [THREAD = THE SHAPING OF WW1 EUROPE]

1881 [15th March] The Balkan Crisis [X - The Romanian Kingdom]: [... Continued from 1878 (29th July)] The Romanian Parliament now proclaim Romania as a kingdom, with Prince Charles of Hohenzollern-Sigmaringen [<=1877 (21st May)] as their first king. He will henceforth be known as Carol I of Romania [=>1914 (3rd August)] [continues at 1882 (6th March)]. [THREAD = THE SHAPING OF WW1 EUROPE]

**ASIDE - ROMANIA IN WW1:** Romania will enter WW1 in 1916 as an ally of Britain, France, and Russia but will rapidly be overrun by German and Austro-Hungarian forces.

1881 [23rd March] Swansea's telegraph exchange is the first in Britain to upgrade to a telephone exchange as well. [THREAD = THE SHAPING OF THE MODERN WORLD]

1881 [31st March] A young Sigmund Freud [Wikipedia biography] qualifies as a physician at the University of Vienna, soon obtaining a junior post at the University of Vienna Psychiatric Clinic [<=1875] under Theodor Meynert [1875<=1884]. [THREAD = WW1 MILITARY MEDICINE AND COGNITIVE SCIENCE]


1881 [15th-26th April] Russian Anti-Semitism [I - The Yelizavetgrad and Kiev Pogroms]: The Russian authorities begin a program of physical violence and economical repression against the Jewish population in Yelizavetgrad [= modern Kirovograd] and Kiev [continues at 1882 (15th May)]. [THREAD = THE SHAPING OF WW1 EUROPE]

1881 [7th June] The Mahdist War, 1881-1899: This 18-year war opens with a Sudanese uprising against Egyptian rule, and then, thanks to Britain's growing influence in Egypt, slowly evolves into a full-scale religious resistance war against Britain. The Sudanese are motivated throughout by the charismatic Muhammad ["the Mahdi"] Ahmad [Wikipedia biography] [<=1883 (3rd November)]. Here are the main engagements ...
THE INITIAL UPRISING
The First Battle of Jabel Qadir, 1881; The Second Battle of Jabel Qadir, 1881; The Battle of El Obeid, 1883; The Siege of Khartoum, 1884

The overall outcome is a British/Egyptian victory and the (temporary) incorporation of the Sudan into Egypt. [THREAD = THE SHAPING OF WW1 EUROPE]

1881 [18th June] The League of the Three Emperors [IV - Redeclared]: [...] Continued from 1879 (7th October) After much behind-the-scenes diplomacy the Dreikaiserbund [<=1873 (23rd October)] is reinstated. However it will endure only for a further six years, collapsing (again) when Austria-Hungary and Russia fall out (again) over the situation in the Balkans [=>1886 (20th August)]. [THREAD = WW1 TREATIES AND ALLIANCES]

1881 [1st July] The Childers Reforms [<=1880 (28th April)] come into force on this date. In its initial form the resulting army establishment is as follows [all entries are =>1914 (4th August [British Army Establishment]) unless otherwise stated] …

CAVALRY REGIMENTS (ELITE AND CEREMONIAL)
The 1st Regiment of Life Guards [<=1781] remains as such.
The 2nd Regiment of Life Guards [<=1781] remains as such.
The Royal Horse Guards (the Blues) [<=1781] remain as such.

CAVALRY REGIMENTS (LINE, HEAVY)
The 1st (King's) Regiment of Dragoon Guards [<=1781] becomes the 1st King's Dragoon Guards.
The 2nd (Queen's Bays) Regiment of Dragoon Guards [<=1781] becomes the 2nd Dragoon Guards (Queen's Bays).
The 3rd (Prince of Wales's) Regiment of Dragoon Guards [<=1781] becomes the 3rd (Prince of Wales's) Dragoon Guards.
The 4th (Royal Irish) Regiment of Dragoon Guards [<=1781] becomes the 4th (Royal Irish) Dragoon Guards.

ASIDE - THE 4TH (ROYAL IRISH) IN WW1: The 4th (Royal Irish) Dragoon Guards will have the dubious honour of firing the British Army's first shots in anger in the run-up to the Battle of Mons [=>1914 (25th August)].

The 5th Regiment of Dragoon Guards [<=1781] becomes the 5th (Princess Charlotte of Wales's) Dragoon Guards.
The 6th (Carabiniers) Regiment of Dragoon Guards [<=1781] becomes the 6th Dragoon Guards (the Carabiniers).
The 7th (The Princess Royal's) Regiment of Dragoon Guards [<=1781] remains as such.

CAVALRY REGIMENTS (LINE, LIGHT)
The 1st Royal Dragoons [<=1781] remain as such.
The 2nd (Royal Scots Greys) Dragoons [<=1781] become the 2nd Dragoons (Royal Scots Greys).
The 3rd (King's Own) Hussars [<=1781] remain as such.
The 4th (Queen's Own) Hussars [1781<=1895 (20th February)] remain as such.
The 5th (Royal Irish) Dragoons [<=1781] become the Royal Irish Lancers.
The 6th (Inniskilling) Dragoons [<=1781] remain as such.
The 7th (Queen's Own) Hussars [<=1781] remain as such.
The 8th (King's Royal Irish) Hussars [<=1781] remain as such.
The 9th (Queen's Royal) Lancers [<=1781] remain as such.
The 10th (Prince of Wales's Own Royal) Hussars [<=1781] remain as such.
The 11th (Prince Albert's Own) Hussars [<=1781] remain as such.
The 12th (Prince of Wales's) Royal Lancers [<=1781] remain as such.
The 13th Hussars [<=1781] remain as such.
The 14th (King's) Hussars [<=1781] remain as such.
The 15th (The King's) Hussars [<=1781] remain as such.
The 16th (Queen's) Lancers [<=1781] remain as such.
The 17th (Duke of Cambridge's Own) Lancers [<=1781] remain as such.
The 18th Lancers [<=1781] remain as such.
The 19th Lancers [<=1781] remain as such.
The 20th Lancers [<=1781] remain as such.
The 21st Lancers [<=1781] remain as such.

INFANTRY GUARDS REGIMENTS
The Scottish Regiment of Foot Guards [<=1781] becomes the Scots Guards.
The 1st Regiment of Foot Guards [<=1781] becomes the Grenadier Guards.
The 2nd (Coldstream) Regiment of Foot Guards [<=1781] becomes the Coldstream Guards.

INFANTRY COUNTY REGIMENTS
The 1st (Royal) Regiment of Foot [<=1781] becomes the Royal Scots (Lothian Regiment).
The 2nd (Queen’s) Royal Regiment of Foot [<=1781] becomes the Queen's (Royal West Surrey) Regiment.
The 3rd Regiment of Foot [<=1781] becomes the East Kent Regiment (the Buffs).
The 4th (The King's Own) Regiment of Foot [<=1781] becomes the King's Own (Royal Lancaster) Regiment.
The 5th Regiment of Foot [<=1781] becomes the Northumberland Fusiliers.
The 6th Regiment of Foot [<=1781] becomes the Royal Warwickshire Regiment.
The 7th (Royal Fusiliers) Regiment of Foot [<=1781] becomes the Royal Fusiliers (City of London) Regiment.
The 8th (Queen’s) Regiment of Foot [<=1781] becomes the Liverpool Regiment.
The 9th Regiment of Foot [<=1781] becomes the Norfolk Regiment.
The 10th Regiment of Foot [<=1781] becomes the Lincolnshire Regiment.
The 11th Regiment of Foot [<=1781] becomes the Devonshire Regiment.
The 12th Regiment of Foot [<=1781] becomes the Suffolk Regiment.
The 13th Regiment of Foot [<=1781] becomes the Somersetshire Light Infantry.
The 14th Regiment of Foot [<=1781] becomes the West Yorkshire Regiment.
The 15th Regiment of Foot [<=1781] becomes the East Yorkshire Regiment.
The 16th (Buckinghamshire) Regiment of Foot [<=1781] becomes the Bedfordshire Regiment.
The 17th Regiment of Foot [<=1781] becomes the Leicestershire Regiment.
The 18th (Royal Irish) Regiment of Foot [<=1781] becomes the Royal Irish Regiment.
The 19th Regiment of Foot [<=1781] becomes the (Princess of Wales's Own) Yorkshire Regiment.
The 20th Regiment of Foot [<=1781] becomes the Lancashire Fusiliers.
The 21st (Royal North British Fusilier) Regiment of Foot [<=1781] becomes the Royal Scots Fusiliers.
The 22nd Regiment of Foot [<=1781] becomes the Cheshire Regiment.
The 23rd (Royal Welch Fusiliers) Regiment of Foot [<=1781] becomes the Royal Welsh Fusiliers.
The 24th Regiment of Foot [<=1781] becomes the South Wales Borderers.
The 25th Regiment of Foot [<=1781] becomes the King's Own Borderers.

ASIDE: There follows a number of regimental mergers. The logic here is that the high-numbered regiment was already in overseas service and simply became the 2nd battalion of the replacement regiment.

The 26th and 90th Regiments of Foot [<=1781] merge as the Cameronian Regiment.
The 27th and 108th Regiments of Foot [<=1781] merge as the Royal Inniskilling Fusiliers.
The 28th and 61st Regiments of Foot [<=1781] merge as the Gloucestershire Regiment.
The 29th and 36th Regiments of Foot [<=1781] merge as the Worcestershire Regiment.
The 30th and 59th Regiments of Foot [<=1781] merge as the East Lancashire Regiment.
The 31st and 70th Regiments of Foot [<=1781] merge as the East Surrey Regiment.
The 32nd and 46th Regiments of Foot [<=1781] merge as the Duke of Cornwall's Light Infantry.
The 33rd and 76th Regiments of Foot [<=1781] merge as the Duke of Wellington's (West Riding) Regiment.
The 34th and 55th Regiments of Foot [<=1781] merge as the Border Regiment.
The 35th and 107th Regiments of Foot [<=1781] merge as the Royal Sussex Regiment.
The 37th and 67th Regiments of Foot [<=1781] merge as the Hampshire Regiment.
The 38th and 80th Regiments of Foot [<=1781] merge as the South Staffordshire Regiment.
The 39th and 54th Regiments of Foot [<=1781] merge as the Dorsetshire Regiment.
The 40th and 82nd Regiments of Foot [<=1781] merge as the Prince of Wales Volunteers (South Lancashire Regiment).
The 41st and 69th Regiments of Foot [<=1781] merge as the Welsh Regiment.
The 42nd and 73rd Regiments of Foot \( \leq 1781 \) merge as the Royal Highland Regiment (the Black Watch).
The 43rd and 52nd Regiments of Foot \( \leq 1781 \) merge as the Oxfordshire Light Infantry Regiment.
The 44th and 56th Regiments of Foot \( \leq 1781 \) merge as the Essex Regiment.
The 45th and 95th Regiments of Foot \( \leq 1781 \) merge as the Derbyshire Regiment (the Sherwood Foresters).
The 47th and 81st Regiments of Foot \( \leq 1781 \) merge as the Loyal North Lancashire Regiment.
The 48th and 58th Regiments of Foot \( \leq 1781 \) merge as the Northamptonshire Regiment.
The 49th and 66th Regiments of Foot \( \leq 1781 \) merge as Princess Charlotte of Wale's (Berkshire) Regiment.
The 50th and 97th Regiments of Foot \( \leq 1781 \) merge as the Queen's Own (Royal West Kent) Regiment.
The 51st and 105th Regiments of Foot \( \leq 1781 \) merge as the King's Own (South Yorkshire) Regiment.
The 53rd and 85th Regiments of Foot \( \leq 1781 \) merge as the King's Light Infantry (Shropshire) Regiment.
The 57th and 77th Regiments of Foot \( \leq 1781 \) merge as the Duke of Cambridge's Own (Middlesex) Regiment.
The 60th (King's Royal Rifle Corps) Regiment of Foot \( \leq 1781 \) becomes the King's Royal Rifle Corps.
The 62nd and 99th Regiments of Foot \( \leq 1781 \) merge as the Duke of Edinburgh's (Wiltshire) Regiment.
The 63rd and 96th Regiments of Foot \( \leq 1781 \) merge as the Manchester Regiment.
The 64th and 98th Regiments of Foot \( \leq 1781 \) merge as the (Prince of Wales's) North Staffordshire Regiment.
The 65th and 84th Regiments of Foot \( \leq 1781 \) merge as the York and Lancaster Regiment.
The 68th and 106th Regiments of Foot \( \leq 1781 \) merge as the Durham Light Infantry.
The 71st and 74th Regiments of Foot \( \leq 1781 \) merge as the Highland Light Infantry Regiment.
The 72nd and 78th Regiments of Foot \( \leq 1781 \) merge as the Seaforth Highlanders.
The 75th and 92nd Regiments of Foot \( \leq 1781 \) merge as the Gordon Highlanders.
The 75th and 92nd Regiments of Foot \( \leq 1781 \) merge as the Gordon Highlanders.
The 79th Regiment of Foot \( \leq 1781 \) becomes the Queen's Own Cameron Highlanders.
The 83rd and 86th Regiments of Foot \( \leq 1781 \) merge as the Royal Irish Rifles.
The 87th and 89th Regiments of Foot \( \leq 1781 \) merge as Princess Victoria's (Royal Irish) Fusiliers.
The 88th and 94th Regiments of Foot \( \leq 1781 \) merge as the Connaught Rangers.
The 91st and 93rd Regiments of Foot \( \leq 1781 \) merge as Princess Louise's (Argyll and Sutherland) Highlanders.
The 100th and 109th Regiments of Foot \( \leq 1781 \) merge as the Prince of Wales's Leinster Regiment (the Royal Canadians).
The 101st and 104th Regiments of Foot \( \leq 1781 \) merge as the Royal Munster Fusiliers.
The 102nd and 103rd Regiments of Foot \( \leq 1781 \) merge as the Royal Dublin Fusiliers.

With a few minor changes the above establishment is that available for deployment at the outbreak of WW1 \( \geq 1914 \) (4th August). [THREAD = WW1 ARMIES, TRADITIONS, AND TACTICS]

1881 [5th July] After some delays for last-minute redesign work, **HMS Inflexible** \( 1876 \) (27th April) \( \geq 1882 \) (11th July) enters service with the Royal Navy. As completed she mounts four 80-ton 16" \( = 406 \) mm rifled muzzle-loading guns. [THREAD = THE SHAPING OF WW1 EUROPE]

********** SOUTH AFRICA BECOMES INDEPENDENT **********

1881 [8th August] The British Parliament recognises the South African [a.k.a. Transvaal] Republic \( 1880 \) (13th December) \( \geq 1902 \) as independent. [THREAD = THE SHAPING OF WW1 EUROPE]

1881 [9th September] **The Orabi Coup**: The Egyptian army officer **Ahmed Orabi** [Wikipedia biography \( \geq 1882 \) (20th May)] stages a military coup against the government of the Egyptian Khedive, **Tewfik Pasha** [Wikipedia biography \( \geq 1882 \) (20th May)]. [THREAD = THE SHAPING OF WW1 EUROPE]
1881 [9th December] The First Battle of Jabal Qadir: This battle is fought as part of the Mahdist War [<=7th June] between an Egyptian column under Rashid Bay Ayman [no convenient biography] and the Mahdist army at Jabal Qadir. The outcome is the annihilation of the Egyptian force. [THREAD = THE SHAPING OF WW1 EUROPE]

1882 Having been at sea since 1845 and now largely obsolete the SS Great Britain [1852 (18th August)<=1886] is refitted as a coal bunkering ship. [THREAD = THE SHAPING OF WW1 EUROPE]

1882 [Sir]1908 Robert A. Hadfield [1st Baronet]1917 [1872<=1886] brings "manganese steel", popularly known as "Hadfield Steel", to market. Around the same time William Denny and Company [<=1870 (10th September)], Dumbarton, build a 300-metre long testing tank in which they can evaluate different hull profiles, propulsion, and steering geometry for speed and stability. [THREAD = THE INDUSTRIAL AND SCIENTIFIC REVOLUTION]

ASIDE: The Denny Tank remains one of the major attractions at the Scottish Maritime Museum [museum website].


1ASIDE: Armstrong do much of their gun production at this time under the trading name Elswick Ordnance Company (EOC), and so the descriptors "Elswick" and "Armstrong" are both seen in the literature.

ASIDE - THE SINGER SEWING MACHINE COMPANY IN WW1: Within days of war breaking out the Singer works will have switched production to munitions components.

1882 The American Bell Telephone Company [1880 (20th March)<=1885 (3rd March)] acquires the controlling interest in the rival Western Electric Company [Wikipedia factsheet=>1913 (18th October)], thus starting to "converge" telegraphy and telephony. Meanwhile in New York City the demand for office typewriting skills has become so great that the Y.W.C.A. begins offering keyboard skills courses to that city's young women. [THREAD = WW1 SIGNALLING AND TELECOMMUNICATIONS]

1882 Wireless Telegraphy, Telephony, and Broadcasting [I - Non-Hertzian Transmission] The British Post Office engineer [Sir]1899 William H. Preece [Wikipedia biography=>24th March] conducts a series of field experiments into the ability of earth conduction and electromagnetic induction to support "wireless" telegraphy. Minor successes are claimed between Southampton and the Isle of Wight, across Lake Coniston in the English Lake District, at Lavernock Point on the Bristol Channel, and between various of the Scottish Islands. Reports lack technical detail, however, and the outcome seems to be that the transmission range is at best only a mile or two and the reception quality very poor. This Non-Hertzian technology will eventually fall by the wayside once Hertzian waves [that is to say, "proper" wireless] become (a) discovered [=>1888], and (b) recognised as the way forward [=>1891] [continues at 1882 (24th March) ...]. [THREAD = WW1 SIGNALLING AND TELECOMMUNICATIONS]
1882 Having lived for four years in Ragusa [then part of Austria-Hungary], Arthur Evans [<=1871] is put on trial as a British agent-provocateur, and expelled the country. [THREAD = WW1 Espionage and Intelligence]

1882 Charles de Bange [<=1872] joins the Cail Company [1844<=1898 (30th August)], now diversified into the armaments industry, as technical consultant. [THREAD = The WW1 Financial and Armaments Industries]

1882 Hysteria [II - Charcot (1882)]: [...] Continued from 1878. Jean-Martin Charcot [1878<=1885 (??th October)] publishes a paper entitled "Essai d'une Distinction Nosographique des divers États Compris sous le Nom d'Hypnotisme", in which he starts to differentiate theoretically between the observable clinical subtypes of hypnogenic response. Charcot's lectures [still famous as the leçons du mardi] are by now something of a celebrity event, attracting academics from far and wide [continues at 1885 (?7th October) ...]. [THREAD = WW1 Military Medicine and Cognitive Science]

**********  The Full Metal Jacket is Born  **********

1882 The Swiss military engineer Eduard Rubin [Wikipedia biography] experiments with lead-filled cupro-nickel bullets. [THREAD = WW1 Small Arms]

1882 [1st January] Zionism Pre-WW1 [III - "Auto-Emancipation" Preached]: [...] Continued from 1877 (undated) Appalled at the ongoing anti-Semitic violence in Russia [<=1881 (15th April)] the physician Leon Pinsker [Wikipedia biography] publishes a pamphlet entitled "Auto-Emancipation" [full text online], in which he calls for a national Jewish homeland and preaches positive action [hence the "do it yourself" implicit in the title] toward achieving this objective. His writings soon come to the attention of the India-born German-English Christian "Restorationist" clergyman, William Hechler [Wikipedia factsheet] [Wikipedia biography=>1885 (undated)], who takes it upon himself to facilitate the Jews' return to their Biblical Promised Land, that is to say, Palestine, presently, of course, a subordinated territory within the Ottoman Empire [sub-thread continues at 31st July ...]. [THREAD = The Battle for Hearts and Minds] [THREAD = The Shaping of the Modern World]

1ASIDE - RESTORATIONISM: Why should Hechler have been so concerned? Well (a) because as a Christian he is driven by thoughts of immortality after the hoped-for "Second Coming" of Christ [Wikipedia factsheet], and (b) because as a Restorationist Christian he believes that this can only happen when the Jews have been repatriated. To Hechler, therefore, it has all been prophesied.


1882 [6th March] The Balkan Crisis [XI - The Kingdom of Serbia]: [...] Continued from 1881 (15th March)] Prince Milan I of Serbia [Wikipedia biography=>1885 (14th November)] is proclaimed king. In the seven years before he eventually decides to abdicate [=1889 (3rd January)] he will do his best to reconcile the three-way tensions between Catholic Austria, Orthodox Russia, and Muslim Turkey [continues at 1885 (14th November) ...]. [THREAD = The Shaping of WW1 Europe]

1882 [16th March] The Navy Estimates, 1882: In delivering the Navy Estimates this year the Parliamentary Secretary to the Admiralty [Sir] George Trevelyan [Wikipedia...
"Hydraulic machinery for turning the turrets, air-compressing machinery for feeding the torpedoes, electrical apparatus for internal communication, for firing broadsides, for illuminating the sea during a nocturnal action - everything is more complicated, everything more special in its nature, everything, above all, the more cruelly expensive. With armour costing £90 a-ton, where, 10 years ago, it cost £40; with the gear for mounting a single pair of guns standing the nation at £12,000, £15,000, £18,000; with torpedoes for offence, and torpedo-netting for defence, required for every vessel of size; defending our coasts; holding our own in the Mediterranean; providing for the protection of our commerce over the globe; surveying and mapping out the sea for the benefit of the entire civilized world; alone among nations making a serious and burdensome effort for the suppression of the Slave Trade, the British Navy cannot fail, under any Administration, to be a heavy call upon the resources even of such a nation as ours." [THREAD = THE SHAPING OF WW1 EUROPE]


The Dolbear Ground Conduction Patent: [Continued from 1882] The American inventor Amos E. Dolbear [Wikipedia biography] files for a U.S. Patent (eventually granted on 5th October 1886 as U.S. Patent 350299) under the title "Mode of Electric Communication" [full text online at http://earlyradiohistory.us/350299.htm]. The physical principle behind his method is "ground conduction", that is to say, using the earth itself as a transmitting medium instead of wires. This is achieved by wiring the transmitting apparatus output terminal to a positively charged earthing rod (treating it an underground aerial, in other words), and by wiring the receiving apparatus input terminal to a similar negatively charged earthing rod some distance away. A microphone in series in the primary coil circuit of the transmitter produces a voltage-modulated voice signal in the former which can be successfully detected by an earphone in the receiver "certainly more than half mile" away. A complementary transmitter-receiver pair in the reverse direction allows two-way conversation speech [as explained in the Companion Resource, the proper name for this arrangement is "half-duplex" - Ed.] [continues at 1888 ...]. [THREAD = WW1 SIGNALLING AND TELECOMMUNICATIONS]

IASIDE: Although the Dolbear system is indeed "wire-less" we have not given it a sub-sequence number within our broader history of wireless telegraphy, etc., because it does not use a Hertzian wave.

ASIDE - GROUND CONDUCTION TELEGRAPHY IN WW1: In the event it took nearly 20 years of further research - much of it by the likes of Nikola Tesla [1881 (??th January)<=??th April] and [Sir] William H. Preece [1882<=1884 (2nd September)] - in order to establish that ground conduction (or for that matter water conduction as well) was never going to compete with the ranges obtainable from Hertzian wave wireless systems such as that developed by Guglielmo Marconi [=>1893]. Nevertheless there was one area where the short range of ground conduction systems was not too much of a problem, and that was in the trenches of WW1, and here the early victory went to the Germans. We shall be telling this story in detail in due course [=>1916 (1st July)] so suffice it for the moment to warn that the German defenders on the Somme would be exploiting earth conduction physics to eavesdrop on British field telephone traffic in the hours before the battle.

1882 [1st April] [Sir] Garnet Wolseley [1st Viscount Wolseley] [1885] [1879 (11th January)<=13th September] is promoted to Adjutant-General of the British Army. [THREAD = THE SHAPING OF WW1 EUROPE]

1882 [15th May] Russian Anti-Semitism [II - The May Laws]: [...] Continued from 1881 (26th April)] The Tsarist government passes laws restricting the rights of their Jewish citizens. This and increasing anti-Semitic violence persuades increasing numbers of Jews to
emigrate to western Europe, Ottoman Palestine\(^1\), and the Americas \([\text{continues at 1891 (23rd April)}]\) \([\text{THREAD = THE SHAPING OF WW1 EUROPE}]\)

\(^1\text{ASIDE - THE BILU:}\) Refugees to Ottoman Palestine took the name "Bilu" (an acronym derived from the Hebrew phrase for "House of Jacob, let us go"), and set about developing vineyards and similar agricultural cooperatives.

1882 \([7\text{th April}]\) **Nikola Tesla** \([24\text{th March} \rightarrow 1883 (10\text{th June})]\) arrives in Paris to take employment with the European branch of the **Edison Company** \([1878 \rightarrow 4\text{th September}]\), installing their D.C. lighting systems. \([\text{THREAD = THE SHAPING OF THE MODERN WORLD}]\)

1882 \([20\text{th May}]\) Italy joins the German alliance with Austria-Hungary, thereby creating the "Triple Alliance" \([\rightarrow 1892 (17\text{th August})]\) \([\text{THREAD = WW1 TREATIES AND ALLIANCES}]\)

1882 \([7\text{th June}]\) **The Second Anglo-Egyptian War**: Following the initial Orabi Coup \([< 1881 (9\text{th September})]\) this war is fought between a British and French amphibious assault taskforce under **Sir Frederick Seymour [1st Baron Alcester]**\(^{\text{LATER THIS YEAR}}\) \([\text{Wikipedia biography}\rightarrow 11\text{th July}]\) and the "legitimate" Egyptians under **Tewfik Pasha** \([< 1881 (9\text{th September})]\), and the Egyptian rebels under **Ahmed Orabi** \([1881 (9\text{th September}) \rightarrow 13\text{th September}]\). The main events are ...

The Bombardment of Alexandria, 1882; The Battle of Tel el-Kebir, 1882

The overall outcome is the defeat of the rebels. The war is noteworthy in the present context for ushering in the 40-year British protectorate which will take Egypt up to and through WW1. \([\text{THREAD = THE SHAPING OF WW1 EUROPE}]\)

1882 \([7\text{th June}]\) **The Second Battle of Jabal Qadir**: This battle is fought as part of the Mahdist War \([< 7\text{th June}]\) between an Egyptian column under **Yusuf Hassan al-Shallali** \([\text{no convenient biography}]\) and the Mahdist army at Jabal Qadir. The outcome is the annihilation of the Egyptian force. \([\text{THREAD = THE SHAPING OF WW1 EUROPE}]\)

1882 \([11\text{th July}]\) **The Bombardment of Alexandria**: This three-day bombardment takes place as part of the Second Anglo-Egyptian War \([< 1882]\) between a British fleet under **Sir Frederick Seymour [1st Baron Alcester]**\(^{\text{LATER THIS YEAR}}\) \([< 1882 (20\text{th May})]\) and the Egyptian Nationalist garrison in the Alexandrian coastal forts. The new **HMS Superb** \([< 1880 (4\text{th October})]\) takes this opportunity to test her 10" guns, and the even newer **HMS Inflexible** \([1881 (5\text{th July}) \rightarrow \text{scrapped 1903}]\) does likewise with her 16" main battery. The French fleet, having no specific orders for such an action, stand off and take no part. The outcome is a rather one-sided victory for the British. The bombardment is noteworthy in the present context (a) for the presence in the fleet of **Prince Louis of Battenberg** \([1874 \rightarrow 1892]\), and (b) because the ruins will be one of the sites inspected by **Sir George Sydenham Clarke [1st Baron Sydenham]** \([1877 (20\text{th July}) \rightarrow 1882 (13\text{th September})]\) when he is asked to assess\(^1\) the effect of artillery against relatively simple, cheap, and quick to construct, fortifications. \([\text{THREAD = WW1 PERMANENT FORTIFICATIONS}]\)

\(^1\text{ASIDE:}\) Clarke's report to the Defence Committee will note caustically that only 20 of the 300 guns in the Egyptian forts had been destroyed.

1882 \([31\text{st July}]\) **Zionism Pre-WW1 [IV - Rishon-le-Zion Founded]**: \([\text{Continued from 1882 (1\text{st January})}]\) Fleeing the ongoing antisemitic violence in Russia \([< 1881 (15\text{th April})]\) a party of ten White Russian (Tsarist Ukraine) migrants, with **Hovevei Zion** \([\text{check them out}]\) funding, found a proto-Zionist settlement in Ottoman Palestine, five miles south of Tel Aviv.
They name it Rishon-le-Zion [Hebrew = "First to Zion"; map, etc.] [sub-thread continues at 1885 (undated) ...]. [THREAD = THE BATTLE FOR HEARTS AND MINDS] [THREAD = THE SHAPING OF THE MODERN WORLD]

********** THE FATHER OF FIRE-CONTROL COMPUTING **********
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1882 [25th August] Sir William Thomson [1st Baron Kelvin] presents a paper entitled "The Tides" [Bartleby full text online] in which he includes a diagram [Figure 132, p10] of a "compounded analog computer", that is to say, one in which a number of separate ball-and-disc integrators (<=1881) cooperate in solving a "harmonic analysis" problem [the reverse engineering of an observed waveform into its underlying equation - Ed.]. In Thomson's case there are eleven such integrators, each sensitive to one of the eleven known influences on tidal height at any given point on the planet. Once each integrator has been initially positioned, then the device as a whole summates their outputs in the form of linear movements of a pen-tracking arm, thus enabling effectively instantaneous tidal predictions for the future to be traced onto a moving paper roll. [THREAD = WW1 CYBERNETICS, COMPUTATIONAL SCIENCE, AND FIRE CONTROL]

ASIDE - THE ANALOG INTEGRATOR IN WW1: In Kelvin's own words, analog computation "substitutes brass for brains", being capable of delivering reasonably accurate results in real time at the turn of a handle or several. Kelvin will later [around 1899] make the acquaintance of the mechanical engineer and inventor Arthur Pollen (=>1901), and will advise him in general terms on how harmonic analysis by analog computer might overcome the mathematical problems involved in gun-laying. Indeed Kelvin is beginning to be recognised as the "father of fire-control computing" (e.g., Gallagher, 2014 online). When once asked how he got to be so clever Kelvin remarks: "I never satisfy myself until I can make a mechanical model of a thing. If I can make a mechanical model I can understand it" (cited in Ariew and Barker, 1996, p55).

********** DIRECT CURRENT AS POWER SOURCE **********

1882 [4th September] The Edison Company [??th April<=1885 (??th April)] Switches on a commercial D.C. electrical power service in Lower Manhattan, New York City. [THREAD = THE SHAPING OF THE MODERN WORLD]

1882 [13th September] The Battle of Tel el-Kebir: This battle takes place as part of the Second Anglo-Egyptian War (<=1882) between a British army under [Sir] Garnet Wolseley [1st April<=1884 (1st September)] and an Egyptian army under Ahmed Orabi [20th May<=d. 1911 (21st September)]. The outcome is a decisive British victory. The battle is noteworthy in the present context (a) for the contribution of 8th Railway Company, Royal Engineers, in keeping Wolseley's troops supplied, (b) for front line use of cabling, and (c) for first use of a field post-office. [THREAD = WW1 ARMIES, TRADITIONS, AND TACTICS]

1883 A young Royal Navy lieutenant named John Jellicoe [Wikipedia biography=>1905] qualifies as a gunnery officer and will serve in a number of progressively more senior positions over the ensuing 22 years. [THREAD = THE WW1 SURFACE NAVIES]

1883 Nervous Shock [VI - Page (1883)]: [... Continued from 1875 (21st April)] The British surgeon Herbert W. Page [no convenient biography=>1891] publishes "Injuries of the Spine and Spinal Cord without Apparent Mechanical Lesion, and Nervous Shock, in their Surgical and Medico-Legal Aspects" [full text online], in which he reviews the neurological basis of the long-standing but still vigorous "railway spine" debate [<=1875]. His main interest
is in "concussion of the spine", that is to say, a short-term loss of function following a whole-body impact of some sort, much like the states of "concussion" already known about with a head impact. More controversially he allows in Chapters 4 and 5 for a range of "fright"-induced effects of a collision, thus ... "Compare two cases of like injury, the one received by accident on a railway and the other by being knocked down and run over in the street, and the probabilities are great that the manifestations of shock will in the former case be more extreme than in the latter. And the difference lies in this, that in the one case there is an element of great fear and alarm, which has perhaps been altogether absent from what may be called the less formidable and less terrible mode of accident. How largely fright may of itself conduce to the condition recognised as shock is well shown by a case communicated to us by a surgeon of large experience, who, summoned to a railway station to see and conduct to the hospital a railway servant who had had his foot, as was supposed, run over on the line, found him in a state of collapse, and in greatest alarm as to the injury to his limb. Upon examination it was discovered that the only damage was the dexterous removal of the heel of his boot by the wheel of a passing engine. And medical literature abounds with cases where the gravest disturbances of function, and even death or the annihilation of function, have been produced by fright and by fright alone" (op. cit., p147).

Page also touches upon the possibility of "hysteria in men"¹, thus ...

"We are much inclined to agree with Mr Jordan [...] that 'the frequency of hysteria (if such a term may be used) in men is not fully recognised' but if the manifestations thereof, as we may admit, are absent or but rarely seen in ordinary men, a condition closely allied to the 'hysteria' of women is very common, or is commonly developed, in men, after the great psychical shock of a railway accident. We know no clinical picture more distressing than that of a strong and healthy man reduced by apparently inadequate causes to a state in which all control of the emotions is well-nigh gone; who cannot sleep because he has before his mind an ever-present sense of the accident; who starts at the least noise; who lies in bed almost afraid to move; whose heart palpitates whenever he is spoken to; and who cannot hear or say a word about his present condition and his future prospects without bursting into tears" (op. cit., p173).

NOTE THE SIMILARITY BETWEEN THE PSYCHOLOGICAL AFTER-EFFECTS OF RAILWAY ACCIDENTS AS DESCRIBED ABOVE AND SHELLSHOCK IN WW1 [continues at 1889 ...]. [THREAD = WW1 MILITARY MEDICINE AND COGNITIVE SCIENCE]

¹ASIDE - HYSTERIA IN MEN: Readers unfamiliar with the history of hysteria as a psychiatric diagnostic entity should note that said condition has traditionally been seen (although not always explicitly described as such) as the result of unexpressed sexual needs in young women. For a much longer history see the Companion Resource [scroll to the entry for "hysteria" and follow any onward pointers].

1883 Having studied under both William James [<=1875] and Wilhelm Wundt [<=1879] the American psychologist G. Stanley Hall [Wikipedia biography] sets up his own experimental psychology laboratory at Johns Hopkins University. Around the same time the German psychiatrist Emil Kraepelin [Wikipedia biography] publishes "Compendium der Psychiatrie", in which he attempts a detailed (and in 2014 still influential) classification of psychiatric illness. [THREAD = WW1 MILITARY MEDICINE AND COGNITIVE SCIENCE]

1883 The Dutch linguist Auguste Kerckhoffs [Wikipedia biography] publishes a two-part paper entitled "La Cryptographie Militaire", in which he considers the practicalities of battlefield communication systems. [THREAD = WW1 ESPIONAGE AND INTELLIGENCE] [THREAD =WW1 SIGNALLING AND TELECOMMUNICATIONS]
ASIDE: Kahn (1996; Chapter 8) discusses Kerckhoffs' work in some detail and draws particular attention to his insight that different rules applied to the occasional communications of ambassadors than did to heavily used battlefield communication systems. In fact, there were two fundamental requirements for a successful field cipher system, namely (a) that it could cope with the volume of traffic likely to be thrown at it, and (b) that its inventors/manufacturers were not necessarily the best people to appraise the systems' weaknesses - thieves needed to be set to catch thieves.

1883 The British engineers Sir Archibald Campbell [1st Baron Blythswood] and W. T. Goolden devise a simple analog computer to measure the rotational speed of ships' propeller shafts [Care (2008 online) for the full story]. [THREAD = WW1 CYBERNETICS, COMPUTATIONAL SCIENCE, AND FIRE CONTROL]

1883 The young American gun designer John Moses Browning starts a profitable 15-year association with the Winchester Repeating Arms Company, adding significantly to its product portfolio, not least with the lever action Winchester Model 1886. Other Browning designs will be developed by the Colt Company. [THREAD = WW1 SMALL ARMS]

1883 The Hamburg-America Line's SS Cimbria collides with a freighter in fog and sinks rapidly, with the loss of 430 passengers and crew. [THREAD = THE SHAPING OF WW1 EUROPE]

1883 Newport Docks [VIII - Alexandra South Dock Authorised]: During the present demand for coal exporting capacity in South Wales that a private member's bill is placed before Parliament seeking permission to extend the North Dock [continues at 1892 (?9th December)]. [THREAD = THE SHAPING OF WW1 EUROPE]

1883 Elihu Thomson and Edwin J. Houston recapitalise and reorganise their American Electric Company as the Thomson-Houston Electric Company. The new investors are led by the American entrepreneur Charles A. Coffin. [THREAD = THE SHAPING OF THE MODERN WORLD]

1883 The Chilean Navy Ship Esmeralda is launched at Armstrong, Mitchell, and Company, Elswick, Newcastle-upon-Tyne. [THREAD = THE WW1 SURFACE NAVIES]

********** ALTERNATING CURRENT AS POWER SOURCE **********

1883 While on detachment in Strasbourg, Nikola Tesla demonstrates a prototype A.C. motor before potential investors (but fails to realise any substantive orders). [THREAD = THE SHAPING OF THE MODERN WORLD]

1883 Funded by the increasingly philanthropically-minded industrialist Andrew Carnegie, the first of many "Carnegie Libraries" opens at his home town in Dunfermline, Scotland. [THREAD = THE WW1 FINANCIAL AND ARMAMENTS INDUSTRIES]

ASIDE: A total of 2509 Carnegie Libraries will be built in Britain and the U.S. between 1883 and 1929, often twinned with public baths.

1883 The Battle of El-Obeid: This battle is fought as part of the Mahdist War between a large but low grade Egyptian column under (the mercenary) William Hicks and a 40,000-strong Mahdist army under Muhammad "the Mahdi" Ahmad personally. Outnumbered five-to-
one and totally out-fervoured Hicks' column is summarily annihilated. [THREAD = THE SHAPING OF WW1 EUROPE]

1884 The Swedish steel company Bofors-Gullspang [Wikipedia factsheet=>1894] uses its Siemens-Martín Open Hearth Furnaces [<=1865] to diversify into weapons manufacture. Around the same time the German glassmakers and technologists Otto Schott [Wikipedia biography], Ernst K. Abbe [Wikipedia biography], and Carl Zeiss [Wikipedia biography] found Glastechnische Laboratorium Schott und Genossen in Jena, Austria. Over the coming years the company will specialise in high quality optics using borosilicate glass. WW1 applications will include sniper scopes and rangefinders. Around the same time Armstrong, Mitchell, and Company [1883 (6th June) =>1887] further extends its steelworks-shipyard at Elswick [map, etc.], Newcastle-upon-Tyne, so that he can offer the War Office a "one-stop shop" capable of building ships in one yard, and then fitting them out with Elswick guns produced in the steelworks next door. The firm will prosper accordingly. [THREAD = THE WW1 FINANCIAL AND ARMAMENTS INDUSTRIES]

1884 The physician and amateur historian Thomas A. Wise [no convenient biography] publishes "History of Paganism in Caledonia" in which he notes similarities between ancient Scottish religious artefacts and those from other cultures in India, Australasia, and North America. [THREAD = WW1 ROMANTIC NATIONALISM]

1884 Neurasthenia [V - Beard (1884)]: [...] Continued from [1881] George M. Beard [<=1881] now publishes a monograph entitled "Practical Treatise on Nervous Exhaustion" [1894 (Third Edition) full text online] in which he restates his earlier arguments [q.v.]. [THREAD = WW1 MILITARY MEDICINE AND COGNITIVE SCIENCE]

1884 Theodor Meynert [<=1881 (31st March)] now publishes "Psychiatrie: Klinik der Erkrankungen des Vorderhirns" [in English as "Psychiatry: Clinical Disorders of the Forebrain"] [full text online], in which he reviews forebrain anatomy and its associated pathology in minute detail. [THREAD = WW1 MILITARY MEDICINE AND COGNITIVE SCIENCE]

**ASIDE:** Despite the sustained popularity of this work at the time, Meynert is nowadays an undeservedly oft-forgotten hero of scientific neuropsychology.

1884 The U.S. Census Bureau civil servant and mechanical engineer Herman Hollerith [Wikipedia biography=>1911] obtains his first patent for a punched card data recording system. It will be money well spent. [THREAD = WW1 CYBERNETICS, COMPUTATIONAL SCIENCE, AND FIRE CONTROL]

**ASIDE:** It was actually a colleague of Hollerith's, John Shaw Billings [<=1881], who had the basic punched card idea.

1884 Drawing on George Garrett's experience with Resurgam II [<=1879], the Nordenfelt Company [<=1875] contracts with the Stockholm shipyard Bolinders [Wikipedia factsheet] to begin work on the Nordenfelt I [no convenient shipography], a small experimental submarine. Three further boats - Nordenfelt II (1886), Nordenfelt III (1887), and Nordenfelt IV (1887) - will follow in short course. [THREAD = THE WW1 SUBMARINE NAVIES]

1884 The British politician Archibald Primrose, 5th Earl of Rosebery [Wikipedia biography] visits Australia, and sets out his vision for an enlightened form of empire, namely a "Commonwealth of Nations" [Wikipedia factsheet]. This vision will be further developed three years later at the First Colonial Conference [=>1887]. [THREAD = THE SHAPING OF WW1 EUROPE]
1884 The American-born (but largely British resident) inventor [Sir] Hiram S. Maxim [Wikipedia biography] patents what will become known to history as the "Maxim Gun". Sold under licence to the European powers it will appear in WW1 as both the German MG08 Spandau [=1901] and the British Vickers Machine Gun [=1896]. [THREAD = WW1 MACHINE GUNS]

********** KEY WW1 TECHNOLOGY **********

===== THE STEAM TURBINE =====

1884 The British engineer Charles A. Parsons [Wikipedia biography] demonstrates the advantages of the steam turbine over the reciprocating steam engine. [THREAD = THE WW1 SURFACE NAVIES]

ASIDE: To quantify this advantage, the turbine-driven destroyer HMS Viper [=1899] was capable of a top speed of 36.5 knots, whilst the conventional reciprocating engines in HMS Havock [=1892] delivered only 27 knots!

1884 The French chemist Paul Vielle [Wikipedia biography] patents "Poudre B" [= "powder B"], a dried and then flaked form of nitrocellulose, which, unless deliberately compressed, deflagrates rather than detonates. It is also around three times as powerful, weight for weight, as gunpowder, is unaffected by damp, and is virtually smokeless when fired. [THREAD = WW1 SMALL ARMS]

1884 [8th January/18th February] On 8th January Charles G. Gordon [Wikipedia biography] departs Britain for Cairo, there to organise the orderly evacuation of the remaining Egyptian garrisons in Sudan. He arrives at Khartoum on 18th February and sets about evacuating women and children from the area. [THREAD = THE SHAPING OF WW1 EUROPE]

1884 [13th March - 1885 (26th January)] The Siege of Khartoum [I - The Early Stages]: Following the defeat at the Battle of El-Obeid [=1883] this siege takes place between the Mahdist-Sudanese army and the British-Egyptian garrison at Khartoum under Charles G. Gordon [8th January<=1885 (26th January)]. The outcome is the total destruction of the garrison [continues at 1st September ...]. [THREAD = THE SHAPING OF WW1 EUROPE]

1884 [6th June] Nikola Tesla [1883 (10th June)<=1885 (??th April)] arrives in New York City. He meets his C.E.O. Thomas A. Edison [1881<=2nd September] the next day and is put in charge of modernising D.C. Generator design. He reportedly recommends A.C. as technically a better prospect but Edison rejects his advice. [THREAD = THE SHAPING OF THE MODERN WORLD]

1884 [9th June] The foundation stone is laid of the new German Parliament building, the Reichstag [Wikipedia factsheet] 1894 (5th December). [THREAD = THE SHAPING OF WW1 EUROPE]

********** GERMANY GOES COLONIAL **********

1884 [5th July] As its first move in the "Race for Africa", Germany proclaims Kamarun [= modern Republic of Cameroon] and Togoland [= modern Ghana] as her first overseas "protectorates" [i.e., colonies]. [THREAD = THE SHAPING OF WW1 EUROPE]

ASIDE - KAMARUN AND TOGOLAND IN WW1: Kamarun and Togoland are occupied with minimal resistance by British, French, and Belgian troops immediately after the war breaks out.

1884 [16th July] George Kynoch and Company [1874<=1888], presently the second largest cartridge manufacturer in Britain, producing some 800,000 cartridges daily, is reorganised as a limited liability company. [THREAD = THE WW1 FINANCIAL AND ARMAMENTS INDUSTRIES]
1884 [25th July] The Pontypridd, Caerphilly, and Newport Railway [II - Open for Freight]: [... Continued from 1878 (8th August)] The PC&NR runs its first coal train from Pontypridd to Alexandra Docks, Newport [continues at 1887 (28th December) ...]. [THREAD = THE SHAPING OF WW1 EUROPE]

1884 [7th August] Germany now proclaims German Southwest Africa [= modern Namibia] as a "protectorate". [THREAD = THE SHAPING OF WW1 EUROPE]

**ASIDE - GERMAN SOUTHWEST AFRICA IN WW1:** After an 11-month campaign German Southwest Africa will be occupied by South African troops on 9th July 1915.

1884 [14th August] Barry Docks [I - The Authorisation]: Sponsored by coal interests unable to use rival facilities at Cardiff and Newport the British Parliament passes the Barry Dock and Railway Company Act (1884), authorising the construction of coal exportation facilities at Barry, some ten miles west of Cardiff [continues at 1889 (18th July) ...]. [THREAD = THE SHAPING OF WW1 EUROPE]

1884 [1st September] The Siege of Khartoum [II - The Relief Attempt]: [... Continued from 13th March] [Sir] Garnet Wolseley [1st Viscount Wolseley] leads a relief column in an attempt to raise the six-month-long siege at Khartoum [continues at 1885 (26th January) ...]. [THREAD = THE SHAPING OF WW1 EUROPE]

********** THE EDISON EFFECT GETS ITS NAME **********

1884 [2nd September-11th October] The Franklin Institute, Philadelphia, hosts an exposition of electrical physics. Thomas A. Edison [6th June=>1888] attends to demonstrate his specially prepared one-way transmitting vacuum bulbs [<=1880 (13th February)]. There to represent the British Post Office [Sir] William H. Preece [1882 (24th March)<=>1892 (26th November)] is fascinated by the demonstration and is gifted several bulbs to take back to Britain for his own research, during which he soon coins the epithet "Edison Effect" to describe the principles involved. [THREAD = THE SHAPING OF THE MODERN WORLD]

1884 [20th September] RMS Etruria [Wikipedia shipography =>1885 (25th April)] is launched at John Elder and Company [1881 (2nd April)<=>1886] for service with the Cunard Line [1871 (16th March)<=>1892 (8th September)]. [THREAD = THE SHAPING OF WW1 EUROPE]

1884 [6th October] The London Underground [III - The Circle Line Completed]: [... Continued from 1876 (18th November)] With the completion of the latest underground station at Tower Hill [see map at 1863 (10th January)] the Circle Line is now fully open, with trains operated (clockwise) by the Metropolitan Railway Company [<=1876 (8th November)] and (counter-clockwise) by the District Railway Company [Wikipedia factsheet] [continues at 1890 (4th November) ...]. [THREAD = THE SHAPING OF WW1 EUROPE]

********** THE "ELSWICK CRUISER" IS BORN **********

1884 [16th October] The Chilean Navy ship Esmeralda [1883 (6th June)<=>1894 (15th November)] enters service. Capable of 18.3 knots she is the fastest armoured warship afloat and the model for many look-alike designs. [THREAD = THE WW1 SURFACE NAVIES]

1884 [3rd November] Germany proclaims German New Guinea, the Bismarck Islands, and the German Solomon Islands as her southeast Asian protectorates. [THREAD = THE SHAPING OF WW1 EUROPE]

**ASIDE - GERMAN SOUTHEAST ASIA IN WW1:** These territories will be occupied with minimal resistance by (New Guinea) Australian and (the islands) Japanese troops in the first weeks of the war.
THE WORLD GETS ITS FIRST SKYSCRAPER

1884 [21st December] After a year in the construction the Home Insurance Building [Wikipedia factsheet], Chicago, is opened. It is a 10-storey 138-foot skyscraper designed by William le Baron Jenney [Wikipedia biography]. It is the world's first building based entirely on a structural steel skeleton frame. [THREAD = THE SHAPING OF WW1 EUROPE]


1885 [... Continued from 1879] Having been collaborating with Remington and Sons [=1853] and the Sharps Rifle Manufacturing Company [=1848 (12th September)], James Paris Lee [1879<=1888 (Lee-Metford) / 1895 (Lee-Enfield)] now sees his 1879 prototype bolt-action magazine rifle come to market as the M1885 Remington-Lee Rifle [Wikipedia factsheet]. [THREAD = WW1 SMALL ARMS]

1885 The French chemist Eugène Turpin [Wikipedia biography] gets positive results from a high brisance [=1832 (ASIDES)] mixture of picric acid [1873<=1888] and guncotton. He patents the concoction under the name "melinite" [=1897], and it will be accepted into production by the French Army two years later. [THREAD = THE WW1 SURFACE NAVIES] [THREAD = WW1 ARTILLERY]

1885 The German engineers Wilhelm Maybach [Wikipedia biography] and Gottfried Daimler [Wikipedia biography] unveil the Standuhr [= "grandfather clock"] prototype of a single cylinder, petrol-driven, internal combustion engine capable of propelling bicycles, carriages, and boats. Around the same time George Forbes [=1877 (24th April)] is awarded a patent for the use of carbon brushes in dynamos and electric motors. [THREAD = THE INDUSTRIAL AND SCIENTIFIC REVOLUTION]

1885 Now resident in New York City the anarchist Johann Most [1874<=1902] publishes a pamphlet entitled "The Science of Revolutionary Warfare", a practical manual of armed street confrontation based on Mikhail Bakunin's [=1872 (2nd September)] notion of the "propaganda of the deed". [THREAD = THE SHAPING OF WW1 EUROPE]

1885 Fortress France and Belgium [VI - Verdun-Douaumont]: [... Continued from 1881] As part of the Séré de Rivières upgrades [=1872 (28th July)], construction work begins on the Fort de Douaumont [Wikipedia factsheet] [=1916 (25th February)], on the heights to the northeast of Verdun. It is the largest and highest of the forts in this sector, and will thus be a focus for both French and German alike during the Battle of Verdun [=1916 (21st February)] [continues at 1887 ...]. [THREAD = WW1 PERMANENT FORTIFICATIONS]

ASIDE - DOUAUMONT TODAY: The fort is nowadays one of the principal sites in the Verdun open air heritage museum [see museum website].
1885 The French chemist Eugène Turpin [Wikipedia biography] patents the use of pressed and cast 2,4,6 trinitrophenol [<=1841] as a high-explosive filling for shells. [THREAD = WW1 ARTILLERY]

**ASIDE**: Trials with the new high-brisance explosives soon expose the unsuitability of masonry-built fortifications, which - compared with reinforced concrete structures - are easier to shatter apart under the sharp pressure waves produced.

********** CLASSIC WW1 WEAPONS TYPE **********

1885 Japanese Navy designers place an order with Yarrow, London, for HIJMS Kotaka [Wikipedia shipography=>1890 (19th August)], a torpedo boat large enough to accompany a battle fleet into action. The vessel is to be built in sections and shipped to Yokosuka, Japan, for final assembly. [THREAD = THE WW1 SURFACE NAVIES]

**ASIDE**: Although ordered as a torpedo boat, hindsight nowadays has it that Kotaka was a transitional torpedo boat destroyer. An order from the Spanish navy for the Destructor [= "Destroyer"], an even bigger vessel, helps consolidate the concept of "the Destroyer" as an ontologically valid new type of vessel [=>1886 (29th July)].

1885 [not specifically dated] Zionism Pre-WW1 [V - Hechler Joins the Diplomatic Service]: [Continued from 1882 (31st July)] William Hechler [1882 (1st January)<=>1894 (undated)] obtains employment as Chaplain to the British Embassy in Vienna, where he will remain for 25 years. He devotes his spare time to researching the scriptures [sub-thread continues at 1886 (undated) ...]. [THREAD = THE BATTLE FOR HEARTS AND MINDS] [THREAD = THE SHAPING OF THE MODERN WORLD]

1885 [1st January] The British academic, inventor, and consulting engineer Henry S. Hele-Shaw [Wikipedia biography] presents a paper to the Physical Society, London, in which he notes the fundamental difference between "continuous computing" - nowadays known as "analog computing" - and "discontinuous computing" - nowadays known as "digital computing". A lively academic debate ensues [for more on the technicalities of the continuous-discontinuous debate see the Companion Resource, comparing Section 2 with Section 3]. [THREAD = WW1 CYBERNETICS, COMPUTATIONAL SCIENCE, AND FIRE-CONTROL]

1885 [26th January] The Siege of Khartoum [III - The City Falls]: [... Continued from 1884 (1st September)] After more than 10 months under siege the Mahdist Army finally breaks into the city, killing Charles C. Gordon [1884 (13th March)<=>dies this day] and putting his entire garrison to the sword. The relief column under [Sir]1885 Garnet Wolseley [1st Viscount Wolseley]1885 [1884 (1st September)<=>1901 (1st November)] arrives two days later. [THREAD = THE SHAPING OF WW1 EUROPE]

1885 [30th March] **The Panjdeh Incident:** A border incident between Russian and Afghan forces at Panjdeh in north-western Afghanistan results in a full-scale diplomatic row between Britain and Russia. Much alarmed at the prospect of Russians as neighbours the north Indian maharajas club together to fund an additional 20,000 reserves for the Indian Army. [THREAD = THE SHAPING OF WW1 EUROPE]

1885 [??th April or hereabouts] Having made as many improvements as he can to their D.C. generators, and having received what he believes to be insufficient reward, Nikola Tesla [1884 (6th June)<=1887 (??th April)] resigns from the Edison Company [1882 (4th September)<=1892 (24th March)]. At much the same time the Italian physicist Galileo Ferraris [Wikipedia biography>=1888 (11th March)] begins to develop a new kind of A.C. electric motor based on induction. [THREAD = THE SHAPING OF THE MODERN WORLD]

1885 [25th April] RMS *Etruria* [=1884 (20th September)] departs Liverpool for New York City on her maiden voyage. Capable of 19 knots she will win the prestigious Blue Riband award four times in the late 1880s. [THREAD = THE SHAPING OF THE MODERN WORLD]

1885 [15th June] HMS *Benbow* [Wikipedia shipography=>1888 (14th June)] is launched at the Thames Ironworks and Shipbuilding Company [1875 (16th November)<=1900 (5th July)]. [THREAD = THE WW1 SURFACE NAVIES]

********** VACCINATION IS BORN **********

1885 [6th July] After nine-year-old Joseph Meister has been bitten by a rabid dog, Louis Pasteur [Wikipedia biography] experimentally uses an untried rabies vaccine on him, and the disease duly fails to develop. [THREAD = WW1 MILITARY MEDICINE AND COGNITIVE SCIENCE]


1885 [??th October] **Hysteria [III - Freud Becomes Interested]:** [...Continued from 1882] Sigmund Freud [1881 (31st March)<=1887 (28th December)] is awarded a four month travelling scholarship to study under Jean-Martin Charcot [=1882]. While he is there he becomes particularly interested in the maestro's views on hysteria and its treatment using hypnosis. One reason for this interest is that he has become friends with Josef Breuer [1880 (??th October)<=1895], who has told him all about his treatment of Bertha ["Anna O"]¹ Pappenheim [=1880 (??th October)]. [THREAD = WW1 MILITARY MEDICINE AND COGNITIVE SCIENCE]

1885 [8th October] SS *La Bourgogne* [Wikipedia shipography=>1898 (4th July)] is launched at Toulon for service with Compagnie Générale Transatlantique [Wikipedia factsheet]. She will make her maiden voyage between Le Havre and New York City on 19th June 1886, achieving a speed of 17 knots. [THREAD = THE SHAPING OF WW1 EUROPE]

1885 [14th-28th November] **The Balkan Crisis [XII - The Serbo-Bulgarian War, 1885]:** [...Continued from 1882 (6th March)] This brief border dispute war is fought between Serbia under Milan I of Serbia [1882 (6th March)<=1889 (6th March)] and the presently disorganised principality of Bulgaria. The outcome is a decisive Bulgarian victory [continues at 1886 (28th August)]. [THREAD = THE SHAPING OF WW1 EUROPE]

1885 [18th December] **Irish Home Rule [V - The 1885 General Election]:** [...Continued from 1882 (17th October)] Riding a wave of popular and intellectual support the Irish Parliamentary Party [1882 (17th October)<=1886 (8th June)] wins 86 seats in Parliament and exchanges its support for the raising of the Government of Ireland Bill [a.k.a the "First Home Rule Bill"] [continues at 1886 (8th June) ...]. [THREAD = THE SHAPING OF WW1 EUROPE]
1885 [30th December] **The Battle of Gennis:** This battle is fought in northern Sudan as part of the Mahdist War [<=1881 (7th June)] between a large Mahdist army and the British garrison at Gennis under [Sir]Francis W. Grenfell [1st Baron Grenfell] and [Sir]William F. Butler. The outcome is a British victory. The battle is noteworthy mainly for being the last fought in red tunics rather than sand or khaki. [THREAD = WW1 ARMS, TRADITIONS, AND TACTICS]

1886 Following up on his success with manganese steel, [Sir]Robert A. Hadfield [1st Baronet] now patents and brings "silicon steel" to market. [THREAD = THE INDUSTRIAL AND SCIENTIFIC REVOLUTION]

1886 Upon the retirement of Isaac Beardmore his nephew [Sir]William Beardmore II [1st Baron Invernairn] replaces him as CEO of the Parkhead Forge. Around the same time John Elder and Company forms, Govan, reorganises itself as the Fairfield Shipbuilding and Engineering Company. At much the same time the American industrialist Andrew Carnegie installs Open Hearth Furnaces in his steelworks. Around the same time two Tyneside heavy engineering firms, the locomotive manufacturer R. and W. Hawthorn and the shipbuilder A. Leslie and Company merge to create Hawthorn Leslie and Company. Around the same time, in collaboration with the Österrichische Waffenfabrik.

ASIDE: Parts of the Fairfield works are nowadays preserved as a heritage museum [see Fairfield Heritage Centre website].

1886 After 30 years of experience with the cast iron casing Boxer shrapnel shell the British Army adopts a steel casing "BL shrapnel" round for use with its new "BL" ordnance. [THREAD = WW1 ARTILLERY]

1886 The British entrepreneur David S. Cargill founds the Rangoon Oil Company to develop oil resources in Burma, Bangladesh, and Assam. [THREAD = THE WW1 FINANCIAL AND ARMAMENTS INDUSTRIES]

1886 Gold is discovered in the Transvaal, resulting in the by-now-usual influx of workers and associated opportunists, both honest and otherwise. [THREAD = THE SHAPING OF WW1 EUROPE]

1886 A group of Welsh ex-patriots based in London club together as Cymru Fydd in order to lobby more effectively for Welsh independence from England. [THREAD = WW1 ROMANTIC NATIONALISM]

1886 The French Army formally approves the Fusil Modèle 1886 - more commonly the Lebel Rifle - a "rugged and reliable" 8mm bolt-action general service weapon fitted with an eight-round under-barrel tube magazine. This weapon is noteworthy in the present context for being the first standard issue weapon to adopt Eduard Rubin's full metal jacket ammunition and Paul Vielle's smokeless powder. Some 2.9 million units will be produced over the ensuing 30 years. Around the same time, in collaboration with the Österrichische Waffenfabrik.
Steyr, the Austrian gunsmith Ferdinand von Mannlicher [Wikipedia biography] patents the "Mannlicher System" for a bolt-action rifle. The weapon will now be further developed prior to entering service in the Austro-Hungarian Army as the Steyr-Mannlicher M1895 [Wikipedia factsheet]. Around the same time the French Army is issued with a new 52cm-long [20 inches] spike bayonet to go with its Lebel Rifles. [THREAD = WW1 SMALL ARMS]

1886 John Fisher [1862=<1904] becomes Director of Naval Ordnance, and sets about upgrading naval gunnery (i.e., equipment, tactics, training, etc.) to increase its effective range. [THREAD = THE WW1 SURFACE NAVIES]

1886 Working to a design by the French architect Victor Laloux [Wikipedia biography] construction begins of a new Basilica to showcase the relics of Saint Martin of Tours [1870 (11th November)<=>1896 (30th May)]. [THREAD = WW1 ROMANTIC NATIONALISM]

1886 [not specifically dated] Zionism Pre-WW1 [VI - Arab Attacks Jewish Settlers]; [Continued from 1882 (31st July)] The first attack by a diasporic [displaced] Arab against Jewish settlers takes place at Petah Tivka [maplink at 1877 (undated)]. They have not stopped since [Wikipedia factsheet] [sub-thread continues at 1894 (undated) ...]. [THREAD = THE BATTLE FOR HEARTS AND MINDS] [THREAD = THE SHAPING OF THE MODERN WORLD]

1886 [8th June] Irish Home Rule [VI - The First Home Rule Bill]; [...] Continued from 1885 (18th December). This first attempt at creating home rule for Ireland is voted down 341 against 311. [continues at 1893 (Second Home Rule Bill) ...]. [THREAD = THE SHAPING OF WW1 EUROPE]

1886 [6th March] The academic journal Scientific American publishes an article [full text online] entitled "The Use of Iron in Fortification", which features, amongst other things, a description of a Schumann-Gruson (=1885) cupola. [THREAD = WW1 PERMANENT FORTIFICATIONS]

1886 [20th March] The American physicist-inventor William Stanley Jnr [Wikipedia biography] ceremonially switches on an area A.C. power supply at Great Barrington, MA. The system is based around a steam-powered alternator by the Siemens Company [1867 (31st December)<=>1892 (6th December)] and transformers and switchgear funded by George Westinghouse Jnr [=1881 (24th January)]. The secret of the system's success is the use of transformed up voltage for the long distance lines, followed by transformed down voltage for local subscribers. Impressed by the success of this pilot project Westinghouse has already (1st January) established the Westinghouse Electric Company [Wikipedia factsheet] to capitalise on the technology and Stanley founds the Stanley Electrical Company [no convenient factsheet] to produce the transformers. Orders flood in. [THREAD = THE SHAPING OF THE MODERN WORLD]

1886 [1st-4th May] The Haymarket Square Riot: On 1st May 1886 American trade unions call mass demonstrations in New York City, Detroit, Milwaukee, and Chicago to celebrate the recently declared "Labour Day" (and the eight-hour working day it is bringing). Emotions have been whipped up by anarchist agitators led by August Spies [Wikipedia biography] and in an armed confrontation on 3rd May two workers are shot by police. The workers then stage a further protest in Haymarket Square, Chicago, at the climax of which a dynamite bomb is thrown into police ranks killing seven policemen and injuring around 60 others. Eight suspected perpetrators - most of them German immigrants - are rounded up the following day. [THREAD = THE WW1 WORKING CLASS SOLDIER]
1886 [25th May] Having been badly damaged by fire the SS Great Britain [1882–1914 (7th December)] is retired as a storage facility at Port Stanley on the Falkland Islands. [THREAD = THE SHAPING OF WW1 EUROPE]

1886 [21st June] The trial starts in Chicago of the eight men accused of the Haymarket Square murders [<=1886 (4th May)]. Seven will in due course be sentenced to death and, of these, four, including the aforementioned August Spies [1st May <= executed 1887 (11th November)], will be executed. [THREAD = THE SHAPING OF WW1 EUROPE]

RESEARCH ISSUE - THE TERRORIST MIND: This as-yet-unanswered question has been nicely discussed by the American academic James H. Billington [Wikipedia biography] in his 1999 book "Fire in the Minds of Men".

1886 [29th July] The Spanish Navy's Destructor [Wikipedia shipography] is launched at J. and G. Thomson and Company [1871–1888 (20th October)], Clydebank. When completed the following spring she will further consolidate the torpedo boat destroyer [=1885 (HIJMS Kotaka)] as a design entity. [THREAD = THE SHAPING OF WW1 EUROPE]

1886 [28th August] The Balkan Crisis [XIII - Stambolov's Bulgarian Regency]: [...] Continued from 1885 (14th November)] Stephan Stambolov [1876 (20th April) <= 1887 (7th July)] defeats a Russian-inspired coup in Bulgaria and assumes the Regency for the ousted Alexander Battenburg, Prince of Bulgaria [Wikipedia biography] => d. 1893 (23rd October)]. Stambolov's "reign" will last until 7th July 1887, by which time agreement has been reached to parachute in Ferdinand of Saxe-Coburg-Gotha [Wikipedia biography] => 1887 (7th July)] as Alexander's successor [continues at 1887 (7th July) ...]. [THREAD = THE SHAPING OF WW1 EUROPE]

1886 [30th September] Recently graduated from the U.S. Military Academy, West Point, a young John J. ("Black Jack") Pershing [Wikipedia biography] => 1898 (1st July)] reports for duty with the 6th U.S. Cavalry Regiment at Fort Bayard, NM. [THREAD = WW1 ARMIES, TRADITIONS, AND TACTICS]

ASIDE - JOHN J. PERSHING IN WW1: Three decades later Pershing will lead the American Expeditionary Force into action.

1886 [28th October] The formal dedication takes place on Liberty Island, New York City, of a 46-metre [= 150 foot] copper over iron and steel sculpture of the French revolutionary icon, Marianne [=1792 (28th October)]. She will become better known in the English-speaking world as the "Statue of Liberty". [THREAD = THE SHAPING OF THE MODERN WORLD]

1886 [18th November] Thanks to the demand for workers' housing Clydebank has now grown large enough to become a borough within Greater Glasgow. [THREAD = THE WW1 WORKING CLASS SOLDIER]


1887 Alfred Nobel [1876–1888 (12th April)] patents "ballistite", a powdered derivative of his blasting gelatine intended to serve as a smokeless propellant in small arms and artillery rather than as a blasting explosive. [THREAD = WW1 SMALL ARMS] [THREAD = WW1 ARTILLERY]
1887 The Germans begin work widening the Eiderkanal [<=1784] into the **Kaiser Wilhelm Kanal**. [THREAD = THE WW1 SURFACE NAVIES]

1887 **Fortress France and Belgium [VII - The Verdun Upgrades]**: [...] Continued from 1885. A modernisation program sees the Verdun forts upgraded with additional concrete topworks [continues at 1897 ...]. [THREAD = WW1 PERMANENT FORTIFICATIONS]

1887 **Armstrong, Mitchell, and Company** [<=1884] start a major production run on a 120mm [= ca. 4.7''] quick-firing design. Most units go as secondary armament on pre-Dreadnought capital ships and main armament on cruisers, but a hundred or so are mounted on army gun carriages and used on the Western Front in WW1 in the hands of Royal Garrison Artillery batteries. [THREAD = WW1 ARTILLERY]

1887 The **First Colonial Conference** takes place in London, providing a forum for dominion governments to help evolve the relationship between themselves and the British Empire. [THREAD = THE SHAPING OF WW1 EUROPE]

1887 **David A. Thomas [1st Viscount Rhondda]**[1916] [1879 (24th April)<=>1888 (14th March)] takes out a lease on Llanwern House [Wikipedia factsheet]. [THREAD = THE WW1 FINANCIAL AND ARMAMENTS INDUSTRIES]

1887 Having prospered greatly from his 1881 investment **Emil Rathenau** [<=1881] consolidates production under the name **Allgemeine Elektricitäts-Gesellschaft** [commonly just "AEG"] [modern corporate website=>1899]. [THREAD = THE WW1 FINANCIAL AND ARMAMENTS INDUSTRIES]

**ASIDE - AEG IN WW1**: During WW1 AEG converted production to munitions [example].

1887 [9th April] **HMS Victoria** [Wikipedia shipography]=>1890 (?7th March) is launched at the **Armstrong, Mitchell, and Company** [1887<=1893 (9th September)], Elswick. [THREAD = THE WW1 SURFACE NAVIES]

1887 [??th April] **Nikola Tesla** [1885 (??th April)<=1891 (11th July)] forms the **Tesla Electric Company** [Wikipedia factsheet=>1888 (1st May)] to capitalise on A.C. power generation and related A.C. motors. With the backing of the lawyer **Charles F. Peck** [no convenient biography] and the businessman **Alfred S. Brown** [no convenient biography] he opens a research laboratory at Rahway, NJ, to work on brushless A.C. motors [continues at 1888 (1st May) ...]. [THREAD = THE SHAPING OF THE MODERN WORLD]

1887 [11th May] The German businessman **Robert Stock** [Wikipedia biography] sets up in the telephone equipment business as the **Deutsche Telephonwerke** [Wikipedia factsheet=>1916 (1st July)] (often abbreviated to D.T.W. or DeTeWe [pronounce as "day-tay-vay"]). Over the next six years the new company will grow to employ 230 people. [THREAD = WW1 SIGNALLING AND TELECOMMUNICATIONS]

1887 [20th June] **The Golden Jubilee: Queen Victoria** [1878 (14th January)<=>d. 1901 (22nd January)] and her Empire celebrate her 50th year on the throne. [THREAD = THE SHAPING OF WW1 EUROPE]

1887 [28th June] Having already cornered the market for architectural steel girders, the **Bethlehem Steel Corporation** [Wikipedia factsheet=>1898], Pennsylvania, now wins valuable contracts to supply guns and armour plate to the expanding U.S. Navy. [THREAD = THE WW1 SURFACE NAVIES]
1887 [7th July] **The Balkan Crisis [XIV - Ferdinand of Bulgaria Installed]**: [... Continued from 1886 (28th August)] With the proclamation of **Ferdinand of Saxe-Coburg-Gotha** [<=1886 (28th August)] as **Prince Ferdinand I of Bulgaria** [>=1886 (??th February)] **Stephan Stambolov** [1886 (28th August)=>assassinated 1895 (6th July)] stands down as Regent and takes instead the position of Prime Minister, a position he will hold until retiring in 1894 [continues at 1899 (6th March)] [...]. [THREAD = THE SHAPING OF WW1 EUROPE]

1887 [14th July] Upon the death of **Alfred Krupp** [<=1877 (1st February)] his interests in the **Krupp Arms Company** [1873<=1893] passes to his only son **Friedrich ["Fritz"] Krupp** [Wikipedia biography=>1902 (22nd November)]. Because the U.S. steel market is starting to be serviced by U.S. steel manufacturers Krupp turns from railway materials to armaments. In Britain, meanwhile, the ailing **Melingriffith Tinplating Works** [1879<=1916] is bought out by **Richard Thomas** [Wikipedia biography=>1916 (28th September)] for a pittance. [THREAD = THE WW1 FINANCIAL AND ARMAMENTS INDUSTRIES]

1887 [24th August] **Cardiff Docks [VIII - Roath Dock Opened]**: [... Continued from 1874 (23rd July)] After 13 years under construction the new Roath Dock opens for business [continues at 1895 (6th July)] [...]. [THREAD = THE SHAPING OF WW1 EUROPE]

1887 [8th November] **The Webley Company** [<=1853] wins a contract to supply 10,000 of its **Mark I Revolver** [YouTube demonstration], a .455" calibre six-shooter, with a rapid eject mechanism. It proves a popular and effective military side-arm, with Marks IV and VI being used throughout WW1, and not being finally withdrawn until 1963. [THREAD = WW1 SMALL ARMS]

1887 [28th December] **Hysteria [IV - Freud (1887)]**: [... Continued from 1885 (??th October)] In a letter to his friend **Wilhelm Fliess** [Wikipedia biography=>1895 (24th July)] **Sigmund Freud** [1885 (??th October)<=1891] mentions having "thrown himself into hypnosis in the last few weeks and [having] achieved all sorts of small but curious successes". Around the same time Freud begins treating one **Anna von Lieben** [Wikipedia biography] under the clinical pseudonym "Caecilie M" [continues at 1895 ...]. [THREAD = WW1 MILITARY MEDICINE AND COGNITIVE SCIENCE]

ASIDE: The Freud-Masson correspondence will continue until 1904, and will eventually be edited and published in 1985 by the American historian **Jeffrey M. Masson** [homepage].

1887 [28th December] **The Pontypridd, Caerphilly, and Newport Railway [III - Open for Passengers]**: [... Continued from 1884 (25th July)] The PC&NR runs its first passenger train from Pontypridd to Newport. [THREAD = THE SHAPING OF WW1 EUROPE]

1888 The New York State investigative committee on electrocution as a method of capital punishment consults **Thomas A. Edison** [<=1884 (2nd September)] on the subject. Because he is no fan of A.C. Edison insists that it is better than D.C. - providing that all you want to do is kill people. Sensing an opportunity to embarrass the rival **Westinghouse Electric Company** [1886 (20th March)<=??(??th July)] he volunteers two of his engineers to produce a prototype electric chair. Having been thoroughly tested on animals the device will be approved for use with effect from 1st January 1889, although the first human execution will not be carried out until the following year [=>1890 (6th August)]. [THREAD = THE SHAPING OF THE MODERN WORLD]

1888 The British War Department organises a competition for optical range-finding devices. The academics **Archibald Barr** [Wikipedia biography=>1893] and **William Stroud** [no
convenient biography=>1893] unsuccessfully submit an entry, but patent their design nonetheless. [THREAD = THE WW1 SURFACE NAVIES] [THREAD = WW1 ARTILLERY]

1888 **Lever Brothers** [1885<=1911] expand into a green-fields site at what is now Port Sunlight on the Wirral Peninsula. Work also starts on an attached model village, nowadays one of the region's major tourist attractions [Port Sunlight Museum] and the home of the Lady Lever art collection [Lever Art Gallery website]. [THREAD = THE SHAPING OF WW1 EUROPE]


1888 The **Nordenfelt Company** [=1875] and the **Maxim Company** [=1884] merge to create the **Maxim-Nordenfelt Guns and Ammunition Company Limited** [Wikipedia factsheet=>1897]. However Nordenfelt will be forced out of the new enterprise two years later and sets up business in France as **Société Nordenfelt** [no convenient factsheet=>1890 (Nordenfelt)]. One of the new company's first contracts is to provide the breech mechanism for the **Model 1891 Field Gun** [=1891]. Around the same time the **Barrow Shipbuilding Company** [=1886] reorganises itself as the **Naval Construction and Armaments Company** [=1897], Barrow. Around the same time **William Beardmore and Company** [1886<=1900] adds armour plate and high pressure boilers to their product portfolio. [THREAD = THE WW1 FINANCIAL AND ARMAMENTS INDUSTRY]

1888 The British Army start to fill explosive shells with **picric acid** [=1885]. Because much of the proving work has been carried out at Lydd, Kent, these projectiles become commonly known in the trade as "lyddites". [THREAD = WW1 ARTILLERY]

**********  THE BRITISH GET THEIR WW1 BULLETS  **********
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1888 The **Royal Small Arms Factory** [1861<=1895], Enfield, releases the **Lee-Metford Rifle** [Wikipedia factsheet]. The design combines James Paris Lee's breech bolt system [1861<=1895] with a black powder prototype of the new .303" cartridge [Wikipedia factsheet] and William Metford's [Wikipedia biography] seven-grooved rifling system [Wikipedia factsheet]. In the event, the Metford rifling suffered rapid wear when the .303" smokeless cartridges became available, and the model will shortly be replaced by the Lee-Enfield [=1895]. Around the same time **Arthur Chamberlain** [Grace's Guide biography] takes over as C.E.O. of **George Kynoch and Company** [1884 (16th July)<=1893]. Under Chamberlain's management the new company will produce much of the new .303" rifle ammunition, as well as the new "Q.F." [= "quick fire"] field gun ammunition and its fuses. [THREAD = WW1 SMALL ARMS]

**********  THE BRITISH ARMY GETS ITS BOVRIL  **********

1888 **John L. Johnston** [=1870] renames his "fluid beef" as "Bovril" [Wikipedia factsheet]. Stirred into a cup of hot water this becomes "beef tea". [THREAD = WW1 LOGISTICS]

1888 **Vickers, Sons, and Company** [1828/1867<=1890] adds armour plate to its product portfolio. [THREAD = THE WW1 FINANCIAL AND ARMAMENTS INDUSTRIES]

1888 Working at the Ingolstadt Arsenal in Bavaria, Germany, the engineer **Konrad Haussner** [no convenient biography=>1890] devises a long-recoil system for artillery pieces based on a cleverly interacting combination of hydraulic, pneumatic, and mechanical damp-and-return subsystems. [THREAD = WW1 ARTILLERY]
1888 Wireless Telegraphy, Telephony\(^1\), and Broadcasting [II - Look, No Wires]:

[Continued from 1882 (24th March)] The German physicist [Heinrich R. Hertz](https://en.wikipedia.org/wiki/Heinrich_Hertz) discovers that the act of triggering a spark-gap\(^2\) electrical circuit causes the transmission of some invisible form of energy across atmospheric space to a simple spark-gap loop aerial some yards away, generating therein a visible spark of its own and thereby demonstrating the existence of electromagnetic waves [continues at 1890 (20th November) ...]. [THREAD = WW1 SIGNALLING AND TELECOMMUNICATIONS]

\(^1\)ASIDE - TELEGRAPHY VERSUS TELEPHONY: Early wireless systems were incapable of controlling the wavelengths of their transmissions and therefore could not transmit the delicate harmonic structures of the human voice or musical instruments. On the other hand they were ideal for transmitting the rough dots and dashes of Morse Code. So there was as yet neither wireless telephony nor wireless broadcasting in 1888, merely wireless telegraphy. We shall continue to show the words " telephony and broadcasting" in grey until the situation changes.

\(^2\)ASIDE - SPARK GENERATION: The simplest way to generate a spark is to break the current passing through the primary windings of an [Induction Coil](https://en.wikipedia.org/wiki/Induction_coil), whereupon the collapsing magnetic field generates an "induced" current in the secondary winding. If the primary winding is of heavy gauge wire carrying a heavy current under a steady voltage (as from a battery), and if the secondary winding is of many thousands of turns of fine gauge wire, then the output voltage will be proportionately greater, typically a pulse of many thousands of volts which can be discharged as a spark if wired into a two-electrode spark-gap. A coil as big as a man produced a million volt spark as early as 1877. Induction coils - colloquially just "coils" - are under the bonnet of many petrol ignition automobiles, reliably producing several trillion sparks in the typical lifetime of that vehicle.

1888 [9th March] Upon the death of [Kaiser Wilhelm I](https://en.wikipedia.org/wiki/Kaiser_Wilhelm_I) [1876 (17th February)] the imperial crown falls to (his only son) [Frederick III of Germany](https://en.wikipedia.org/wiki/Frederick_III_of_Germany) [1887<=>1910 (15th January)], but he has only weeks to live. [THREAD = THE SHAPING OF WW1 EUROPE]


1888 [14th March] [David A. Thomas [1st Viscount Rhondda]](https://en.wikipedia.org/wiki/David_A._Thomas) [1887<=1910 (15th January)] Wins a by-election for the Merthyr Tydfil constituency, beginning a 22-year career in politics. [THREAD = THE WW1 FINANCIAL AND ARMAMENTS INDUSTRIES]


***** H.M. TREASURY REPACKAGES SLAVERY LOAN *****

1888 [16th March] The [1833 Slavery Compensation Loan](https://en.wikipedia.org/wiki/1833_Slavery_COMPENSATION_LOAN) [TBA - Old Debts Repackaged]: [Continued from TBA] On 16th March 1888 Chancellor of the Exchequer [George Goschen [1st Viscount Goschen]](https://en.wikipedia.org/wiki/George_Goschen) [1890] submits the [1888 National Debt (Conversion) Bill](https://en.wikipedia.org/wiki/1888_National_Debt_Conversion_Bill) [UK Government briefing] to Parliament for second reading [Hansard full text online TECHNICAL AND TIRESOME]. Included in Goschen's proposals is the 1835 3.4% slavery compensation gilt [remember that although Parliament approved the loan in 1833, the moneys were not raised until 1835 - Ed.], still the largest single element of Britain's national debt. To cut a long story very short, there is presently a move to refinance gilts paying over 3%
because at the moment interest rates are low. We do not need the details for our present purposes because we shall eventually be averaging such outgoings over a much longer period. [THREAD = SOVEREIGN DEBT, HOW IT REALLY WORKS] [THREAD = STOCK MARKET AND FINANCIAL SHARP PRACTICE]


1888 [3rd April] The (fictional) City of London clerk Charles Pooter [Wikipedia biography] has his (equally fictional) diary serialised in London's lightly satirical Punch magazine. It is an immediate hit with the real City of Londoners during their daily commute. The authors are the brothers George Grossmith [Wikipedia biography] and Weedon Grossmith [Wikipedia biography]. The essence of the diary's long-running joke is that Pooter is a lower middle class social climber, making him an easy figure of fun to those both above and below him on the social ladder. Indeed non-Britons can learn a lot about late Victorian values by studying this work. [THREAD = THE WW1 MIDDLE CLASS SOLDIER]

1888 [12th April] Upon the death of Ludwig Nobel [<=1879] the news agencies mistakenly circulate the obituary for Alfred Nobel [1887<=1896 (10th December)], thus allowing the latter to hear what the world really thinks of him. He is reportedly deeply disturbed to find himself described as "the Merchant of Death", whose contribution to Humankind had been in finding new ways of killing them more efficiently. [THREAD = THE WW1 FINANCIAL AND ARMAMENTS INDUSTRIES]

1888 [1st May] [Continued from 1887 (??th April)] The Tesla Electric Company [1887 (??th April)<=??th July] is granted U.S. patents for a family of brushless A.C. "induction motors" [Wikipedia factsheet]. Like the pre-existing D.C. motors [Wikipedia factsheet] the Tesla motor consists of a bearing-mounted spindle - the "rotor" - positioned inside a fixed torus - the "stator". The rotor is thus intimately exposed to whatever magnetic field can be generated within the stator, and a powerful rotational moment will result if both rotor and stator can be oppositely magnetised. In D.C. motors the magnetisation of the rotor is achieved by building it as an "armature", that is to say, with two or more wire-wound shoulders. When a driving current passes through these windings a magnetic field is created which reacts with that from the stator to create the all-important rotational moment. The technical problem, of course, is how actually to get that current into the rotor, for it is a moving part. This problem is overcome (a) by adding a "commutator" - positive and negative electrical contact zones - to the spindle and by then wiring the armature coils back to these, and (b) by resting spring-loaded positive and negative "brushes" against the commutator so as to deliver the driving current regardless of the commutator's rotation. In Tesla's designs, by contrast, the rotor is magnetised by induction, that is to say, by "rotating" it inside the magnetic field provided by the stator. But since it is presently at rest Tesla's stroke of genius is to simulate the rotation by rotating the stator field instead (not the stator itself, note, but the magnetic field it produces) He achieves this by delivering the driving current in rotating on-off phases. No current is needed in the rotor, and therefore no commutator and no brushes are needed as in a D.C. motor. A few days later (16th May) Tesla will present his system to the American Institute of Electrical Engineers [Wikipedia factsheet] in a lecture at Columbia University entitled "A New System for A.C. Motors and Transformers" (Corum and Corum, 2014 online). [THREAD = THE SHAPING OF THE MODERN WORLD]
1888 [14th June] **HMS Benbow** [1885 (15th June)<=>scrapped 1909] is commissioned. As completed she is armed with two of the new breech-loading Elswick 16.25" [=413mm] guns, mounted singly in centre-line barbettes fore and aft. [THREAD = THE WW1 SURFACE NAVIES]

1888 [15th June] **Frederick III of Germany** [=1870 (6th August)] dies, and is succeeded by his son Wilhelm [=1859 (27th January)] as **Kaiser Wilhelm II** [=1888], the new emperor will spend the first two years of his reign squabbling with his Chancellor, **Otto von Bismarck** [1878 (13th June)<=>1890 (18th March)], whom he regards as overly right wing on social policy. [THREAD = THE SHAPING OF WW1 EUROPE]

1888 [28th July] **Fortress France and Belgium [VIII - Liège and Namur]:** [... Continued from 1887] Construction work begins on the Brialmont [=1874] forts at Liège and Namur. There will be 12 forts around Liège, of which the Fort de Loncin [image] is typical, and nine around Namur. They are built using poured concrete rather than stonework, and fitted with Krupp guns in Gruson armoured steel turrets [=1855 (1st June)]. [THREAD = WW1 ARTILLERY]

**ASIDE - HOW TO PLAN AHEAD:** The German Second and Third Armies will attack these forts on 16th August 1914 and the assault will rely on heavy howitzers and siege mortars, such as the 420mm Big Bertha howitzers specified for exactly this purpose 12 years beforehand [=1904].

1888 [10th August] **The Daimler-Maybach Company** [=1885] successfully fit one of their internal combustion engines into an airship. [THREAD = WW1 AVIATION]

1888 [10th August] Now nearly 88 years old **Helmuth von Moltke [the Elder]** [=1870 (19th September)] finally retires as Chief of the German General Staff and is replaced by **Alfred von Waldsee** [Wikipedia biography]=>1891 (7th February)]. [THREAD = WW1 ARMIES, TRADITIONS, AND TACTICS]

1888 [24th September] The French Navy launches **Le Gymnote** [Wikipedia shipography], an electrically powered submarine. [THREAD = THE WW1 SURFACE NAVIES]

1888 [20th October] The twin-propeller passenger liner **SS City of Paris** [Wikipedia shipography]<=>scrapped 1923] is launched at **J. and G. Thomson and Company** [1871<=>1895 (27th May)], Clydebank, for service with the **Inman Line** [15th March<=>1893 (22nd February)]. She will depart on her maiden voyage to New York City on 3rd April 1889. [THREAD = THE SHAPING OF WW1 EUROPE]

**ASIDE - THE CITY OF PARIS IN WW1:** Under American ownership after 1893 and renamed **SS Philadelphia** in 1901, the ship was used as an American troopship in 1917-1918.

********** THE TRAUMATIC NEUROSI S IS BORN **********
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1889 **Nervous Shock [VII - Oppenheim (1885)]:** [... Continued from 1883] The German neurologist **Hermann Oppenheim** [Wikipedia biography]=>1894] publishes a monograph entitled "**Die Traumatische Neurosen**" [= "The Traumatic Neuroses"] in which he allows that psychological traumas (fear, loss, guilt, etc.) are perfectly capable of causing physiological reactions which, in turn, are perfectly capable of causing chronic
neurotic mind states and behaviours [continues at 1891 ...]. [THREAD = WW1 MILITARY MEDICINE AND COGNITIVE SCIENCE]

1889 German Military Intelligence [I - The News Service]: The German General Staff establishes a Nachrichtendienst [= "news service"] under Artur von Dankenschweil [no convenient biography] [continues at 1893 ...]. [THREAD = WW1 ESPIONAGE AND INTELLIGENCE]

1889 Herman Hollerith [=1884] now has enough of a reputation for his Tabulating Machine Company to win the contract to process the data from the 1890 US census. The US Census Bureau, for their part, is quick to buy, not least because it has only just finished manually processing the 1880 figures! [THREAD = WW1 CYBERNETICS, COMPUTER SCIENCE, AND FIRE CONTROL]

**ASIDE:** All went perfectly, and within a year the machines had tabulated over 62 million US citizens (Cortada, 1993). Hollerith is also quick to open the technology up to the larger private corporations for their operational and business intelligence needs. The New York Central Railroad began processing their freight-handling paperwork in 1895. The 1900 US census earned a gross revenue of $428,000, and in 1911 Hollerith's company merged with several others to become the Computing - Tabulating - Recording Company (CTR). This was the first of many commercial successes, and the punched card system dominated commercial data processing until well into the 1950s. In 1914, Thomas J. Watson [Wikipedia biography] joined CTR from NCR as general manager, and in 1924 Watson had CTR renamed as part of a corporate makeover, choosing the name International Business Machines (IBM).

1889 The Armour Race [III - Nickel-Steel Plate]: [... Continued from 1877 (Compound Armour)] The Schneider Company [=1877] unveils its latest high performance steel alloy, based on 4% nickel. Weight-for-weight the new plate outperforms the older iron-steel compounded plate [continues at 1890 (Harvey Armour) ...]. [THREAD = THE WW1 FINANCIAL AND ARMAMENTS INDUSTRIES]

1889 The French War Department adopts the visually distinctive "Beehive Fuse" for its long-range-therefore-long-burn timed fusing applications. The hive shape is due to a spirally wound length of igniferous fuse within. [THREAD = WW1 ARTILLERY]

1889 In a palace conversation later recorded in his mother's private correspondence Kaiser Wilhelm II [1888 (15th June)<=>1st August] indicates the root of some of his personal angst...

"An English doctor killed my father and an English doctor crippled my arm - all due to my mother who would not have Germans near her." [THREAD = THE SHAPING OF WW1 EUROPE]

1889 A conglomerate of Belgian arms manufacturers comes together under the name Fabrique Nationale d'Armes de Guerre [Wikipedia factsheet] in Herstal, near Liege, in order to service a contract to manufacture 150,000 Mauser Model 89 Rifles [Wikipedia factsheet] for the Belgian government. This variant comes in 7.65mm calibre with a five-round box magazine and stripper clip reloading. [THREAD = THE WW1 FINANCIAL AND ARMAMENTS INDUSTRIES][WW1 SMALL ARMS]

********** IMPORTANT WW1 TECHNOLOGY **********

==== CORDITE ====

1889 The British chemists James Dewar [Wikipedia biography] and Sir Frederick Abel [Wikipedia biography] together with the German-born William Kellner [no convenient biography] patent the smokeless powder they have been working on at the Royal Laboratory, Woolwich, giving it the name "cordite". Basically, the new powder is a micro-flaking of the residue created when a colloidal solution of 58% nitroglycerine and 37% guncotton is carefully dried out. [THREAD = WW1 SMALL ARMS]
Like its competitors, cordite burns more slowly than gunpowder, thereby reducing barrel overstress, outright barrel failure, and barrel wear. Although smokeless, cordite is not also flash-less, making it actually no better than gunpowder for night operations.

1889 The German philosopher Friedrich W. Nietzsche [Wikipedia biography] publishes a short treatise on cultural decadence entitled Götzten-Dämmerung [= "of the idols, the twilight"; in English as "Twilight of the Idols" (a play on words on Richard Wagner's opera title "Götterdämmerung")]. We mention this work because it includes the now famous [but far from proven - Ed.] observation that "what does not destroy me makes me stronger". [THREAD = WW1 MILITARY MEDICINE AND COGNITIVE SCIENCE]

1889 The Daimler-Maybach Company [<=1885] unveils the world's first automobile. [THREAD = THE INDUSTRIAL AND SCIENTIFIC REVOLUTION]

1889 [19th January] The 10,000 ton twin-screw passenger liner SS Teutonic [Wikipedia shipography=>1st August] is launched at Harland and Wolff [1871 (17th October)<>1895 (24th December)], Belfast, for service with the White Star Line [1873 (1st April)<>1899 (23rd November)]. Equipped with the new triple-expansion engines she will be capable of 20.5 knots. [THREAD = THE INDUSTRIAL AND SCIENTIFIC REVOLUTION]

ASIDE - THE SS TEUTONIC IN WW1: The Teutonic was converted into an armed merchant cruiser in 1914 and spent the war on convoy escort duties.

1889 [30th January] Upon the death of only son Crown Prince Rudolph of Austria [Wikipedia biography] the imperial succession passes initially\(^1\) to his uncle Archduke Karl Ludwig of Austria [Wikipedia biography=>1896 (19th May)]. [THREAD = THE SHAPING OF WW1 EUROPE]

\(^1\)ASIDE: Karl Ludwig will not actually inherit because he predeceases the incumbent Franz Joseph on 19th May 1896, at which point his own son Franz Ferdinand [1870 (5th September)<>1896 (19th May)] becomes heir to the empire.

1889 [6th March] The Balkan Crisis [XV - The Abdication of Milan I of Serbia]: [...] Continued from 1887 (7th July)] Upon the abdication of Milan I of Serbia [1885 (14th November)<>d. 1901 (11th February)] his throne passes to his 12-year-old son Alexander I of Serbia [Wikipedia biography=>1903 (11th June)], with his mother as Regent for the first four years of his reign. After said Regency Alexander allows/encourages the Serbian people's Slavic affinity with Russia starts to come to the fore, thus helping to create the confrontation between Austria-Hungary and Russia which helped start WW1. [THREAD = THE SHAPING OF WW1 EUROPE]

1889 [1st May] The United Telephone Company [<=1880 (13th May)] merges with a number of provincial British telephone companies to form the National Telephone Company [Wikipedia factsheet=>1892 (22nd March)]. Around the same time the Post Office buys up the Submarine Telegraph Company [Grace's Guide factsheet], complete with their cable-ship Lady Carmichael [no convenient shipography=>1914 (4th August)]. [THREAD = THE SHAPING OF THE MODERN WORLD]

1889 [6th May-31st October] The Paris World Fair: This six-month celebration of the centenary of the Storming of the Bastille [<=1789 (14th July)] takes place on a 240-acre site in central Paris stretching from the Champs de Mars to the Quai d'Orsay, and is so arranged that the arch of the newly completed Eiffel Tower may act as its main entrance gate. [THREAD = THE SHAPING OF THE MODERN WORLD]

1889 [18th July] Barry Docks [II - The Ceremonial Opening]: [...] Continued from 1884 (14th August)] After five years in construction the new dock at, and the railway to, Barry are formally
opened. Within three years Barry Docks are shipping more coal tonnage than Cardiff
[continues at 1913 ...]. [THREAD = THE SHAPING OF WW1 EUROPE]

1889 [1st-6th August] **German Naval Expansion [I - The Spithead Naval Review]**: The British Royal Navy stages one of its periodic shows of strength. Amongst the dignitaries attending are Kaiser Wilhelm II [1889<=27th October] and the up-and-coming naval advisor Alfred von Tirpitz [Wikipedia biography=1897 (15th June)]. They also show off the brand new SS Teutonic [19th January<=scraped 1921]. Reportedly the Kaiser returns home determined to build some super-ships of his own (and Tirpitz is destined to help him do so) [continues at 1890 (22nd April) ...]. [THREAD = THE WW1 SURFACE NAVIES]


1889 [27th October] The marriage takes place in Athens, Greece, of Crown Prince Constantine of Greece [Wikipedia biography=1913 (18th March)] and 19-year-old Princess Sophia of Prussia [1870 (14th June)<=1915 (5th August)], younger sister to (now) Kaiser Wilhelm II [1st August<=1890 (18th March)]. [THREAD = THE SHAPING OF THE MODERN WORLD]

1890 Drawing on his tour of inspection of the damaged Alexandria forts, George Clarke [=1882 (11th July)] publishes *Fortification: Its Past Achievement, Recent Development, and Future Progress*, in which he notes how hard it has been for artillery to reduce fortifications at Plevna [=1877 (20th July)] and Alexandria [=1882 (11th July)]. The best way to fortify Britain, he concludes, will always be to possess a strong navy. [THREAD = THE WW1 SURFACE NAVIES]

********** A CHILL WIND BLOWS FOR COAL **********

1890 The Italian navy experiments with fuel oil as an alternative to coal. [THREAD = WW1 SURFACE NAVIES][THREAD = THE SHAPING OF THE MODERN WORLD]

********** CLASSIC OF NAVAL THEORY **********

1890 The President of the [U.S.] Naval War College Alfred T. Mahan [Wikipedia biography] publishes *The Influence of Sea Power upon History, 1660-1783* [full text online], in which he identifies naval strength as the deciding factor in the making of empires (and naval weakness as a factor in Britain's defeat in the War of Independence). The work will be avidly read by all parties in the Naval Expansion Race of the early 20th century [=1889 (1st August)]. [THREAD = WW1 SURFACE NAVIES] [THREAD = THE SHAPING OF THE MODERN WORLD]

1890 The "Puteaux 75" Project [I - Initial Scoping]: When the French War Department learns of Konrad Haussner's [1888<=1891] experiments with long-recoil technology they ask Joseph-Albert Deport [Wikipedia biography=1892 (13th July)] at the Puteaux Atelier [=1872 (28th July)] to produce a French equivalent. Société Nordenfelt [1888<=1891] is awarded the contract to design an eccentric screw breech mechanism for the new weapon [continues at 1891 (??th September) ...]. [THREAD = WW1 ARTILLERY]

1890 [7th January] [... Continued from 1873 (30th January)] In an attempt to travel around the world in a newsworthy 72 days, and having been on the road since 14th November 1889, the American journalist "Nelly Bly" [Wikipedia biography] boards the RMS Oceanic [1875 (11th March)<=scraped 1896] at Yokohama, bound for San Francisco. Arriving on 21st January 1891 she has gone two days behind schedule due to poor weather. However her sponsor Joseph Pulitzer [Wikipedia biography] has had the foresight to charter a private train to get her across to New York City, where she arrives with a couple of hours to spare. [THREAD = THE SHAPING OF WW1 EUROPE]
1890 [18th March] **HMS Victoria** [1887 (9th April)<=1893 (22nd June)] is commissioned. As completed she has the thickest armour and heaviest guns - two Elswick breech-loading 16.25" (=413mm) - of any vessel afloat. She is also the first capital ship to be fitted with the new triple-expansion steam engines. [THREAD = THE WW1 SURFACE NAVIES]

1890 [18th March] Following a disagreement over social policy **Kaiser Wilhelm II** [1889 (27th October)<=1896 (3rd January)] instructs his Chancellor **Otto von Bismarck** [1888 (15th June)<=d. 1898 (30th July)] to resign and replaces him with **Leo von Caprivi** [Wikipedia biography=>1894 (26th October)], under whose four-year period in office Germany will pursue a relatively pro-British foreign policy. [THREAD = THE SHAPING OF WW1 EUROPE]

1890 [13th April] In the British General Election this year a young Welsh politician named **David Lloyd George [1st Earl Lloyd-George of Dwyfor]** [1945 [Wikipedia biography]=>1905 (10th December)] is returned as M.P. for Caernarvon Boroughs. [THREAD = THE SHAPING OF WW1 EUROPE]

1890 [22nd April] **German Naval Expansion [II - Von Hollmann Position]:** [... Continued from 1889 (1st August)] **Friedrich von Hollmann** [Wikipedia biography=>1896 (3rd January)] becomes Germany's Navy Secretary, a position he will hold until 6th June 1897 [=q.v.]. Given Germany's ambitions to develop a far-flung empire of its own, his view on the naval expansion question is that a strong cruiser fleet (plus the bases necessary to service it) would be more useful than a battlefleet [continues at 1897 (6th June) ...]. [THREAD = THE WW1 SURFACE NAVIES]

1890 [17th July] Upon the death of **Willoughby Smith** [<=1880 (25th March)] control of **Elliott Brothers** [1880 (25th March)<=1893] passes to his sons **William O. Smith** [<=1880 (25th March)] and **Willoughby S. Smith** [<=1880 (25th March)]. [THREAD = WW1 CYBERNETICS, COMPUTATIONAL SCIENCE, AND FIRE CONTROL] [THREAD = THE WW1 FINANCIAL AND ARMAMENTS INDUSTRIES]

1890 [6th August] The murderer **William F. Kemmler** [Wikipedia biography<=dies this day] has the dubious honour of being the first person in history to be electrocuted by New York State's new electric chair [<=1888]. The event does not go at all well, reportedly taking a full eight minutes at 2000 volts to extinguish all signs of life, along with much singeing and sizzling. [THREAD = THE SHAPING OF THE MODERN WORLD]

1890 [19th August] **HJMS Kotaka** [<=1885] finally enters service as a *torpedo boat destroyer* capable of operating either in a costal defence role or attached to a battle-fleet. [THREAD = THE WW1 SURFACE NAVIES]

1890 [20th November or hereabouts] **Wireless Telegraphy, Telephony, and Broadcasting [III - The Branly Aerial]:** [... Continued from 1888] The French physicist **Édouard Branly** [Wikipedia biography=>1897] demonstrates a device for detecting low intensity electromagnetic waves. The device consists of a contained tube of iron filings with electrical terminals at both ends. In its resting state this arrangement will exhibit high electrical resistance due to the microscopically thin layer of oxide around each metallic granule. However when the tube is subjected to an incoming electromagnetic wave the granules enter a low-resistance state, which in turn increases the current which can pass through it should it be positioned in an electrical circuit. Branly called his device a "radio-conductor" [continues at 1891...]. [THREAD = WW1 SIGNALLING AND TELECOMMUNICATIONS]

********** THE ELECTRIC UNDERGROUND RAILWAY IS BORN **********

1890 [28th November] **The London Underground [IV - The "Tube"]:** [... Continued from 1884 (6th October)] **The City and South London Railway** [Wikipedia factsheet] completes a new
underground railway line between King William Street (in the heart of London's financial quarter) and Stockwell. Because the new line passes under the River Thames it is a bored tunnel rather than the much cheaper "cut-and-cover" tunnels already used elsewhere. Since this, in turn, means that steam locomotives can not be used the new line relies on electric traction instead. [THREAD = THE SHAPING OF THE MODERN WORLD]


1890 [1st November] Forty eight small British chemical companies merge to form the United Alkali Company [Grace's Guide factsheet=>1926], with a head office at Widnes, Lancashire. [THREAD = THE SHAPING OF WW1 EUROPE]

1890 [29th December] The Wounded Knee Massacre: This battle-atrocity takes place as part of the Ghost Dance War [Wikipedia factsheet] between a Minnecongou and Hunkpapa Sioux village and a column of 7th U.S. Cavalry under James W. Forsyth [Wikipedia biography]. The outcome is a somewhat one-sided victory for the White Man. One of the wounded is Chief Iron Hail [Dewey Beard] [Wikipedia biography], a Minnecongou veteran of the Battle of the Little Bighorn [<=1876 (25th June)]. [THREAD = THE SHAPING OF WW1 EUROPE]

**ASIDE:** Chief Iron Hail will not die until 1955 and will be much interviewed by journalists and historians once the Indian Wars come to an end.

1890 The Armour Race [IV - Harvey Armour]: [...] Continued from 1889 (Nickel-Steel)] The American engineer Hayward A. Harvey [Wikipedia biography] invents "Harvey Armour", a hardened-layer nickel steel plate for sheathing vulnerable areas in warships [continues at 1893 (Krupp) ...]. [THREAD = THE WW1 SURFACE NAVIES]

**ASIDE - "CEMENTATION":** The surface layer of a thick slab of steel can be "cemented" - hardened - by keeping it at around 1200 degrees Celsius for many days under a layer of charcoal, and by then cooling it rapidly.

********** THE ELECTRON IS NAMED BEFORE BEING FOUND **********

1891 The Anglo-Irish physicist George J. Stoney [Wikipedia biography]=>1897 (30th April) coins the term "electron" to refer to a hypothetical basic unit of electricity [continues at 1897 (30th April) ...]. [THREAD = THE SHAPING OF THE MODERN WORLD]

1891 The Tredegar Ironworks [1882=>1895] starts to close down its ironworks as no longer viable [they have a mountain of coal in the vicinity but have exhausted their local iron ore reserves]. They now concentrate instead on developing local coal reserves. [THREAD = THE SHAPING OF WW1 EUROPE]

1891 Locating Brain Function [III - Freud (1891)]: [... Continued from 1875] Sigmund Freud draws on his non-psychiatric clinical experience to produce a monograph on aphasia theory entitled "Zur Auffassung der Aphasien" [in English (1953) as "On Aphasias"] [continues at 1895 ...] [for further commentary see the Companion Resource]. [THREAD = WW1 MILITARY MEDICINE AND COGNITIVE SCIENCE]

1891 Ferdinand von Zeppelin [1874 (25th March)<=>1898 (??th May)] retires from the army and begins full-time design work for a rigid-frame airship. [THREAD = WW1 AVIATION]


1891 The Psychology of the Uncanny [V - Gothic Fiction (Wilde)]: [Continued from 1857] The Irish playwright Oscar Wilde publishes "The Picture of Dorian Gray" [Amazon], his only novel. Inspired by the Gothic fiction genre, it weaves a morality tale with a distinctly Faustian theme, allowing Gray to pursue a life of eternal youth, self-indulgent womanising, murder, and general debauchery, whilst diverting all the worry-lines and grey hairs to his portrait [sub-thread continues at 26th May 1897]. [THREAD = THE SHAPING OF THE MODERN WORLD] [THREAD = THE BATTLE FOR HEARTS AND MINDS] [THREAD = THE POWER OF GOTHIC IMAGERY]

1891 [16th January] The Chilean Civil War: This war is fought between forces loyal to the Chilean president José Balmaceda [Wikipedia biography] and forces wishing to depose him in favour of a National Congress. The outcome is a victory for the rebels. The war is noteworthy in the present context for an attack by two of the Presidential Navy's torpedo boats, the Almirante Lynch [Wikipedia shipography] and Almirante Condell [no convenient shipography] in which the rebel ironclad frigate Blanco Encalada [1875] [Wikipedia shipography] is hit by a surface-launched free-running Whitehead torpedo and sunk, the first vessel in history to suffer this fate. [THREAD = THE WW1 SURFACE NAVIES]

1891 [22nd January-22nd March] The rising star of the Hamburg-America Line [1883 (19th January)=>1900 (10th January)], Albert Ballin [Wikipedia biography]=>1899], accompanies 241 passengers on a Mediterranean cruise aboard his company's SS Augusta Victoria [Wikipedia shipography]. The voyage is nowadays identified as the first cruise-ship holiday. [THREAD = THE SHAPING OF THE MODERN WORLD]

1891 [7th February] Count Alfred von Schlieffen [Wikipedia biography]=>1894 (Schlieffen Plan)] is appointed Chief of the German General Staff and takes it upon himself to study the shape of any future war on the Western Front, the better to shape the German Army to that task. [THREAD = WW1 GRAND STRATEGIES]

1891 [26th February] HMS Royal Sovereign [Wikipedia shipography]=>scraped 1913 is launched at Portsmouth Dockyard. She is the lead ship in an eight-ship class of 14,000 ton "Pre-Dreadnought" battleships, armed with four 13.5" [=343mm] breech loading guns in two twin barbettes and capable of 17.5 knots. Her combination of firepower, operational
range, defensive armour, and speed classifies the class and its subsequent copy-cats as "Pre-Dreadnoughts". [Wikipedia factsheet and discussion]. [THREAD = THE WW1 SURFACE NAVIES]

1891 [27th February] Germany now proclaims **German East Africa** [= roughly modern Rwanda, Burundi, and Tanzania] as a "protectorate". [THREAD = THE SHAPING OF WW1 EUROPE]

**ASIDE - GERMAN EAST AFRICA IN WW1:** Thanks to the strategic and tactical skills of Paul von Lettow-Vorbeck [Wikipedia biography=>1914 (2nd November)] German East Africa will become (and remain) a thorn in the flesh for the British throughout WW1.

********** CZECH AND SLOVAK NATIONALISM IS BORN **********

1891 [5th March] The Bohemian Nationalist **Tomáš Masaryk** [Wikipedia biography=>1915] is elected member of the Austrian Reichsrat, where he starts to promote the national identity of the Czech and Slovak provinces of the Austro-Hungarian Empire. [THREAD = THE SHAPING OF WW1 EUROPE] [THREAD = WW1 ROMANTIC NATIONALISM]

********** ALTERNATORS AS HIGH FREQUENCY TRANSMITTERS **********

1891 [10th April - 1892 (?7th February)] **Wireless Telegraphy, Telephony, and Broadcasting** [IV - The Hertzian Penny Drops]: [Continued from 1890 (20th November)] Three more or less simultaneous but independent technical assessments indicate that a workable technique for long-range wireless transmission is in the offing. The first observation is by **Alexander P. Trotter** [Grace's Guide biography] in an Editorial in the 10th April edition of *The Electrician*, drawing attention to the promise of Hertz's findings. The second prediction is on ??th December by the Irish physicist **Frederick T. Trouton** [Wikipedia biography], who remarks in a lecture that the Tesla Electrical Company's alternators [<=1887 (?7th April)] would make good high frequency wireless transmitters if suitably upgraded. And the third prediction, drawing on his 30 years' experience with spectroscopy and wave physics, is on ??th February 1892 by the British physicist [Sir]1897 **William Crookes** [Wikipedia biography], who suggests that because "Hertzian Waves" have the power to pass through solid objects they might one day be used for wireless telecommunications purposes (Hong, 2001) [continues at 1893 ...]. [THREAD = WW1 SIGNALLING AND TELECOMMUNICATIONS]


1891 [23rd April] **Russian Anti-Semitism** [V - The Moscow Deportations]: [... Continued from 1882 (15th May)] The Russian authorities clamp down on Moscow's Jewish community. Over the ensuing two years some 20,000 Jews are deported into the Pale1, in what with grim humour they term the "New Exodus" [continues at 1903 (6th April) ...]. [THREAD = THE SHAPING OF WW1 EUROPE]

1ASIDE - THE PALE: The "Pale of Settlement" [Wikipedia factsheet] was a large area of undeveloped territory in western Russia derived from the old Polish-Lithuanian Commonwealth. Banned even there from congregating in the cities the Jews settle for the shtetls (Yiddish = "little towns") (where many will remain until the Nazis pass through going in the opposite direction in 1941).

1891 [20th May] **Wireless Telegraphy, Telephony, and Broadcasting** [V - Tesla's Observation]: [Continued from 10th April] Now every bit as interested in wireless technology as in power generation **Nikola Tesla** [1888 (16th May)<=1893 (29th November)] delivers a second lecture at Columbia University [<=1888 (1st May)], this time entitled "Experiments with Alternate Currents of Very High Frequency", in which he demonstrates that "coupled tuning" can greatly enhance the efficiency of a wireless transmission system [continues at 1892 (26th November) ...]. [THREAD = WW1 SIGNALLING AND TELECOMMUNICATIONS]

1ASIDE - COUPLED TUNING: What Tesla had accomplished in the months prior to this lecture was to develop an accurate tunable transformer-oscillator system wherein the resonant
frequency of an old-fashioned induction coil [<=1888] can be precisely adjusted by moving the coils relative to each other. In fact he was very adventurous with his concentric coil design, and one particular layout it itself now known as the "Tesla Coil" [Wikipedia factsheet], and is famous for making very large sparks - see YouTube tutorial (great fun).

1891 [21st June] A Telluride, Colorado, entrepreneur named Lucien L. Nunn [Wikipedia biography] collaborates with the Westinghouse Electric Company [1888 (?7th July)<=1895 (25th August)] to build a hydroelectric generating plant at nearby Ames [map, etc.]. The plant deploys a six-foot diameter turbine wheel beneath a 300-foot head of water and uses a Tesla Alternator [<=1887 (??th April)] to produce 75kW of power. Nunn capitalises on this high-profile success by immediately seeking investors for a similar hydroelectric installation at Niagara Falls [=>1895 (25th August)]. [THREAD = THE SHAPING OF THE MODERN WORLD]

1891 [??th September] The "Puteaux 75" Project [II - Proof of Concept Testing]: [...] Continued from 1890] The French Army begins trials of an experimental Model 1891 57mm Field Gun. The project is led by Charles Étienne Saint-Claire-Deville [no convenient biography=>1894 (15th October)] at the Bourges Arsenal. The weapon is cutting-edge technology in that it uses smokeless propellant [<=1884 (Vielle)], brass cartridge ammunition [<=1870 (de Reffye)], and a Nordenfelt breech [<=1890]. However with the long-recoil system still being worked on, the weapon has to make do with a short-recoil system [continues at 1892 (13th July) ...]. [THREAD = WW1 ARTILLERY]


1892 Prince Louis of Battenberg [1882 (11th July)<=1899 (??th June)] designs the Battenberg Mark I Course Indicator [Wikipedia factsheet], an analog computational device for ready-reckoning the course to be steered to close with a chosen vessel, given your own speed and the course and speed of the chosen vessel. Elliott Brothers [1890 (17th July)<=1893] are pleased to run him up a few prototypes. [THREAD = WW1 CYBERNETICS, COMPUTATIONAL SCIENCE, AND FIRE CONTROL]

1892 The Krupp Company [1877 (1st February)<=1893] takes over fortification steelwork specialists Schumann-Gruson [<=1891] and adopts Konrad Haussner's [1890<=1909] long-recoil technology. The new division is named Krupp-Panzer [= "Krupp armour"] and - with few new forts being constructed - starts to specialise instead in ships' turrets. Around the same time Andrew Carnegie [1886<=1909 (2nd March)] brings together a number of smaller Pittsburg, PA, steelworks to form the Carnegie Steel Company [Wikipedia factsheet=>30th June]. [THREAD = THE WW1 FINANCIAL AND ARMAMENTS INDUSTRIES]

1892 The young British artist Howard Carter [Wikipedia biography]=>1894] joins Flinders Petrie's [<=1880] expedition to el-Amarna, where his draughtsmanship skills are used to record tomb decorations. [THREAD = PRE-WW1 INTELLECTUAL RIVALRY]

********** ON "PLAYING THE GAME" **********

1892 The British Romantic poet [Sir]1915 Henry J. Newbolt [Wikipedia biography]=>1897] publishes a poem entitled "Vitai Lampada" [= "The Torch of Life"] [notes and full text online], in which a well-played game of cricket becomes an allegory for a well-fought battle, and then, indeed, for life itself. If cynically dissected it becomes just cheap and dangerous romanticism but it is nonetheless an immediate popular favourite¹ and will still be being taught in English literature classes in the 1960s [my own included - Ed.]. [THREAD = WW1 ROMANTIC NATIONALISM] [THREAD = THE WW1 MIDDLE CLASS SOLDIER]
The popularity embarrassed Newbolt himself who later described the work as “a Frankenstein's Monster” he regretted ever having created.

The American engineer Benjamin Holt [Wikipedia biography] founds the Holt Manufacturing Company [Wikipedia factsheet=>1904 (24th November)] to market heavy agricultural machinery. The company inherits Holt's previously acquired skills with combine harvesters (1883) and steam traction engines (1890). [THREAD = WWI ARTILLERY] [THREAD = THE WWI TANK]

The U.S. Government's new immigration station on Ellis Island off the Battery, Lower Manhattan, processes its first European immigrants. [THREAD = THE SHAPING OF WW1 EUROPE]

450,000 immigrants were processed in 1892 alone, and by the time the facility closed on 12th November 1954 this will rise to some 12 million. Ellis Island is nowadays a heritage museum [see museum website], and a haunting witness to the inability of the European nations to offer these people a future in the lands of their birth.

Upon the death of Frederick R. Leyland [=1873 (1st January)] the British entrepreneur [Sir] John Ellerman [Wikipedia biography=>1902 (1st October)] leads a consortium of investors in taking over the Leyland Line [1873 (1st January)<> 1902 (1st October)]. [THREAD = THE SHAPING OF WW1 EUROPE]

Elihu Thomson [1883 (??th April)<>24th March] is awarded a U.S. Patent #471155 [full text online] on an improved form of A.C. Motor in which there is a single stator driving circuit rather than many, as with the earlier Tesla machines [=1888 (1st May)]. Around the same time he demonstrates how a shunt 1 comprising an inductor and a capacitor can be used as a high frequency "oscillator". [THREAD = THE SHAPING OF THE MODERN WORLD]

A shunt is a high-resistance sub-circuit (often including one or more capacitors) arranged so as to short-circuit the power supply to an electrical device of some sort. Its resistance prevents significant loss of power to the primary device but its electronic characteristics often add desirable properties to the performance of the circuit as a whole.

The British Postmaster General Sir James Fergusson [Wikipedia biography] announces that the government intends taking into public ownership the trunk lines presently managed by the National Telephone Company [1889 (1st May)<>1912 (1st January)]. The enabling legislation - the Telegraph Act 1892 - is passed on 28th June. [THREAD = WWI SIGNALLING AND TELECOMMUNICATIONS]


We presume that this merger was somehow conditional upon the granting of Elihu Thomson's patent only two days previously. Certainly the new patent gave whoever owned it the ability to compete meaningfully in the A.C. marketplace with the Westinghouse Electric Company [=1888 (??th July)] and their now-no-longer-unique Tesla technology. In the event Westinghouse will go to the wall in the crash of 1910.
1892 [27th June] The Admiralty places an order with John I. Thornycroft and Company [Wikipedia shipography=>1892 (2nd July)]. These will be the first Royal Navy vessels under this new classification [<=1885 (HMS Kotaka)]. [THREAD = THE WW1 SURFACE NAVIES]

1892 [30th June-20th November] The Homestead Strike: This 143-day exercise in union-breaking by the Carnegie Steel Company [1892<=1901 (2nd March)] pits the Amalgamated Association of Iron and Steel Workers against another private army of Pinkerton's Agents [c.f. <=1874 (?7th December)]. The outcome is a victory for the union-busters. [THREAD = THE WW1 FINANCIAL AND ARMAMENTS INDUSTRIES][THREAD = THE WW1 WORKING CLASS SOLDIER]

1892 [2nd July] The Admiralty places an order with the Yarrow and Company [Wikipedia factsheet], Poplar, for two Havock-class torpedo boat destroyers of 275 tons [Wikipedia shipography=>1899 (6th September)]. [THREAD = THE WW1 SURFACE NAVIES]

1892 [13th July] The "Puteaux 75" Project [III - Substantive Approval]: [...] Continued from 1891 (?7th September) The French War Ministry signs the development contract for a 75mm version of the Model 1891 57mm field gun, much as prototyped but now with a long-recoil system. This upgrade project will be managed by Joseph-Albert Deport [1890<=1894 (15th October)] at the Puteaux Atelier [<=1872 (28th July)] [continues at 1894 (15th October) ...]. [THREAD = WW1 ARTILLERY]

********** THE FIRST SOCIALIST IN THE BRITISH PARLIAMENT **********

1892 [26th July] This year's General Election returns the Scottish workers' rights activist James Kier Hardie [Wikipedia biography=>1906 (15th February)] as Member of Parliament for West Ham South. When he attends his first parliamentary session on 3rd August he breaks with convention and wears "Sunday best" rather than garden party clothes, that is to say, a tweed suit, a red tie, and a deerstalker hat. The British Press take him to task for daring to disrespect the ancient ways. [THREAD = THE WW1 WORKING CLASS SOLDIER]

********** MARIANNE AND THE BEAR**********

1892 [17th August] The Franco-Russian Alliance: This treaty between France under Marie Carnot [Wikipedia biography] and Russia under Alexander III [1881 (13th March)<=1894 (1st November)] sees both parties undertake that if either is mobilised against or attacked by one or more of the Triple Alliance [1882 (20th May)<=1914 (29th June)] powers - that is to say, Germany, Austria-Hungary, or Italy - the other will mobilise against or attack said power(s). [THREAD = WW1 TREATIES AND ALLIANCES]

1 ASIDE: The allusion here is to the contemporary cartoon.

1892 [7th September] The first edition of the British boys' magazine "Chums" is published. [THREAD = THE SHAPING OF WW1 EUROPE][THREAD = WW1 ROMANTIC NATIONALISM]

1892 [8th September] The twin-screw passenger liner RMS [HMS]1914 Campania [Wikipedia shipography=>sunk in collision 1918 (5th November)] is launched at Fairfield Shipbuilding and Engineering Company [1886<=1893 (2nd February)], Govan, for service with the Cunard Line [1884 (20th September)<=1893 (2nd February)]. Fitted with triple expansion engines she will be capable of 22 knots. [THREAD = THE SHAPING OF WW1 EUROPE]

ASIDE - [HMS] CAMPANIA IN WW1: At the outbreak of the war the Campania - on the verge of being scrapped - was requisitioned by the Royal Navy for conversion into a seaplane carrier, in which largely experimental role she served until sunk in a collision on 5th November 1918.
1892 [26th November] **Wireless Telegraphy, Telephony, and Broadcasting [VI - The 1892 Lavernock Transmission]**: [Continued from 1891 (20th May)] In one final attempt to get non-Hertzian "wireless" transmission working [Sir]1899 William H. Preece (1884 (2nd September)<=>1896 (30th March)) and his team of Post Office engineers conduct further experiments between Lavernock Point, on the coast ten miles west of Cardiff and Flatholm Island some three and a half miles out into the Bristol Channel. Results remain unimpressive [continues at 1893 ...]. [THREAD = WW1 SIGNALLING AND TELECOMMUNICATIONS]


1892 [??th December] **Newport Docks [IX - Alexandra South Dock Opened]**: [... Continued from 1883 (30th January)] After nine years in the construction the Alexandra South Dock finally opens for business [continues at 1905 (?)th June)], [THREAD = THE SHAPING OF WW1 EUROPE]

1893 **Wireless Telegraphy, Telephony, and Broadcasting [VII - The Branly-Lodge Coherer]**: [Continued from 1892 (26th November)] The British physicist [Sir]1902 Oliver J. Lodge [Wikipedia biography]=>1894 (14th August)] adopts Édouard Branly's granule aerial device, but prefers the name "coherer" (because it is based on the sudden electrical cohering of iron filings in an electromagnetic field). Unimpressed, Branly continues to use the term "Radio-Conductor". By whatever name the device soon becomes the aerial design of choice until the development of valve-based amplifiers [=>1906 (29th January)] [continues at next entry ...], [THREAD = WW1 SIGNALLING AND TELECOMMUNICATIONS]

1893 **Wireless Telegraphy, Telephony, and Broadcasting [VIII - The Righi Oscillator]**: [Continued from preceding entry] The University of Bologna physicist Augusto Righi [Wikipedia biography]=>1894 is presently studying the generation of Hertzian waves [<=1888] using a "Three-Spark Oscillator" [image/comment at http://www.mhs.ox.ac.uk/marconi/exhibition/marconiarrives.htm] of his own design. "Several times" over the coming two or three years, at the request of a "mutual acquaintance", he will give courtesy demonstrations of his equipment and his research to a young Guglielmo Marconi [Wikipedia biography]=>1894. Marconi has already benefited from two years in a similar tutorial relationship with Vincenzo Rosa [no convenient biography] at the University of Livorno [continues at 1894 ...]. [THREAD = WW1 SIGNALLING AND TELECOMMUNICATIONS]

1893 **George Kynoch and Company** [1888<=>1895] expands into the production of high explosive shells. [THREAD = WW1 ARTILLERY]

1893 What little is left of the Bibby Line [<=1873 (1st January)] is contracted by the British War Office as a provider of troopship services around the British Empire. [THREAD = WW1 ARMIES, TRADITIONS, AND TACTICS]

1893 **Elliott Brothers** [1892<=>22nd June [ASIDE]] takes over Meinrad Theiler and Sons [<=1891] and [Sir]1920 George K.B. Elphinstone [1891<=>1895] becomes chairman of the enlarged company at only 28 years of age. As we shall be seeing in due course, he is entering a four-decade period of sustained technical creativity of no little value to the British WW1 war effort. [THREAD = WW1 CYBERNETICS, COMPUTATIONAL SCIENCE, AND FIRE CONTROL] [THREAD = THE WW1 FINANCIAL AND ARMAMENTS INDUSTRIES]

1893 **German Military Intelligence [II - The Russian Service]**: [... Continued from 1889] The German General Staff now extends its initial Nachrichtendienst [= "news service"] by
establishing news monitoring stations in selected Polish and East Prussian towns [continues at 1906 ...]. [THREAD = WW1 ESPIONAGE AND INTELLIGENCE]

1893 The Müggelsee Research Station [I - Founded]: A fisheries research station is founded on the shores of the Müggelsee [map, etc.], a lake in the Friedrichshagen suburb of Berlin. A 34-year-old zoologist named Johannes Frenzel [no convenient biography] is appointed as the station's first director [continues at 1897 (21st October) ...]. [THREAD = THE SHAPING OF THE MODERN WORLD]

1893 Now partnered by Alvah C. Roebuck [Wikipedia biography], Richard W. Sears [<=1888] expands his catalogue to include general merchandise. The new partnership trades on as Sears, Roebuck, and Company [Wikipedia factsheet] and proudly proclaims itself to be the "Cheapest Supply House on Earth". [THREAD = THE SHAPING OF THE MODERN WORLD]

1893 The Armour Race [V - Krupp Armour]: [... Continued from 1890 (Harvey)] The Krupp Arms Company [1892<=>1894] develops chromium steel plate - popularly known as "Krupp Armour" - whose resistance to penetration is as good as that of Harvey Armour [<=1890] some 20% thicker and heavier [continues at 1894 ...]. [THREAD = THE WW1 FINANCIAL AND ARMAMENTS INDUSTRIES]

1893 (2nd February) The twin-screw passenger liner RMS Lucania [Wikipedia shipography] is launched at Fairfield Shipbuilding and Engineering Company [1892 (8th September)<=>1905 (??th July)], Govan, for service with the Cunard Line [1892 (8th September<=>1902 (6th August)]. Flat out, her two five cylinder triple-expansion engines give her a speed of 23.5 knots. Her first class accommodation and facilities are conspicuously luxurious and well-equipped. [THREAD = THE SHAPING OF WW1 EUROPE]

1893 (22nd February) The Inman Line [<=1888 (20th October)] is taken over by the Philadelphia-based American Line [Wikipedia factsheet] [1902]. [THREAD = THE SHAPING OF WW1 EUROPE]

1893 (1st May-30th October) The Chicago World Fair: This six-month-long celebration of culture and engineering features, amongst many many other things, the piano playing of Scott Joplin [Wikipedia biography] and an Eisteddfod for America’s Welsh-speaking immigrants, all in the shadow of an 80-metre [= 264 feet] Ferris wheel. And not just any Ferris wheel, indeed, but one designed by George Ferris [Wikipedia biography] himself, and built by the Bethlehem Steel Company [1893<=>1898 (27th May)]. [THREAD = THE SHAPING OF THE MODERN WORLD]

ASIDE: Fairground wheels had in fact been around for at least 50 years but never to this scale. After Chicago, however, everyone wants to have their own. In America the most famous is built in 1897 by the showman George C. Tilyou [no convenient biography] at his Steeplechase Park complex at Coney Island, NY [Wikipedia factsheet] in 1897 (28th July). London already has its 94-metre Great Wheel under construction for 1895, Vienna will get its iconic Riesenrad [German = "giant wheel"; Wikipedia factsheet] in 1897 [only 65 metres, but still running - check it out], and Paris will top them all with its 100 metre Grande Roue in 1900. (As far as we can tell, the Germans chose not to compete in the Ferris Wheel Race).

1893 (8th May) A young Helen Keller [Wikipedia biography] cuts the ceremonial first turf for the American Telephone and Telegraph Company ["Ma Bell"]'s new research facility at 1527 35th Street NW in Washington, DC [National Historic Monument webpage]. [THREAD = THE SHAPING OF THE MODERN WORLD]
1893 [16th May] The first patients are accepted at the new London County ["Claybury"] Lunatic Asylum [Wikipedia factsheet]. [THREAD = WW1 MILITARY MEDICINE AND COGNITIVE SCIENCE]

**ASIDE - CLAYBURY ASYLUM IN WW1:** Claybury Asylum had no direct role to play in WW1 but contributed indirectly by taking civilian patients from London's other asylums. Claybury's Director of Pathology for example, Frederick W. Mott [Wikipedia biography] (of whom more later) was moved across to the King's College Hospital, Denmark Hill.

1893 [22nd June] HMS Victoria [1890 (??th March)<=] [lost this day] is sunk in a collision with HMS Camperdown [Wikipedia shipography] while practising an (in retrospect) overly complex 11-ship fleet manoeuvre. It takes her only 13 minutes to sink because, being only on manoeuvres, her watertight doors have not been shut. Of her crew 357 are rescued but 358 are drowned. [THREAD = THE WW1 SURFACE NAVIES]

**ASIDE:** It emerged during the Enquiry that Camperdown's bridge rang down for full speed astern on the engine-room telegraph [=1870 (1st September)] but that only three-quarters speed showed on the engine-room repeater. Such mis-registerings were not, it further emerged, uncommon, thanks to slackness or corrosion of the mechanical linkage between the two stations. The incident was seized upon as something of a marketing gift by Elliott Brothers [1893<=>1894 (30th March)], manufacturers of a rival, electrically transmitted, engine-room telegraph system [continues at 1894 (30th March) ...].


1893 [4th/8th September] Irish Home Rule [VII - The Second Home Rule Bill]: [...] Continued from 1886 (8th June)] This second attempt at creating home rule for Ireland passes in the Commons on 4th September by 301 votes to 267 but falls in the Lords on 8th September by 419 votes to 41 [continues at 1902 (26th February) ...]. [THREAD = THE SHAPING OF WW1 EUROPE]

***** A WORLD HISTORIC DATE *****

1893 [11th September] Ukraine, Pre-WW1 [I - Ukrainians In The New World Get Homesick]: [New sub-thread] On 11th September 1893 a Ukrainian immigrant named Hrihorii Hrushka [no convenient biography] publishes the first edition of a new Ukrainian-language newspaper named Svoboda [= "liberty"; check it out IT WASN'T JUST RECIPES FOR BORSCHT]. It is based in Jersey CityNJ but proves popular with other homesick Ukrainians across North America. At time of writing [= March 2023], it is still going strong - see website [sub-thread continues at TBA], [THREAD = THE SHAPING OF THE MODERN WORLD] [THREAD = THE BATTLE FOR HEARTS AND MINDS] [THREAD = THE NEVER-ENDED RUSSIAN CIVIL WAR, 1917-ONGOING] [THREAD = THE COLD WAR IN THE MAKING]

1893 [29th November] In a lecture to the International Electrical Congress at the Chicago World Fair entitled "Mechanical and Electrical Oscillators" [transcript online] Nikola Tesla [1891 (20th May)<=>1897 (19th July)] talks about natural oscillations in general and describes his own attempts to advance from generating electrical oscillations electromechanically to generating them electronically in inducting circuits. [THREAD = THE SHAPING OF THE MODERN WORLD]

1893 [18th December] The German psychologist Carl Stumpf [Wikipedia biography] (20th December) is put in charge of expanding the experimental psychology facilities at the University of Berlin. Based initially in three rooms at 5 Dorotheenstraße he will hold this position for the next 28 years [continues at 1900 (20th December) ...]. [THREAD = THE SHAPING OF THE MODERN WORLD]
1894 After a period as Keeper of the Ashmolean Museum in Oxford, **Arthur Evans** [<1871] goes back to field archaeology [and spying - Ed.] on the island of Crete - still part of the ailing Ottoman Empire - where he specialises in the ruins of the Minoan civilisation at Knossos. Around the same time **Howard Carter** [<1892] joins **Édouard Naville**'s [Wikipedia biography] expedition to Deir el-Bahari, recording the art and inscriptions in the Temple of Hatshephut. [THREAD = PRE-WW1 INTELLECTUAL RIVALRY]

1894 **The Armour Race [VII - Krupp Cemented Armour]:** [...] Continued from 1893] By adding small percentages of manganese and other additives to its chromium steel, the **Krupp Arms Company** [<1893><1896] develops armour which combines a carbon "cemented" outer surface over a softer but more elastic inner surface. Overall it is no more resistant to penetration than the original Krupp armour [<1893] but it retains its structural integrity longer when hit repeatedly. They market this new product as "Krupp Cemented Armour" [often just "KCA" in the literature]. Around the same time **Alfred Nobel** [<1887] buys into **Bofors-Gullspang** [<1884><1906] and a young German chemist named **Fritz Haber** [Wikipedia biography] joins the Technical High School at Karlsruhe as junior lecturer in physical chemistry. [THREAD = THE WW1 FINANCIAL AND ARMAMENTS INDUSTRIES]

***** HUMANKIND PUT UNDER THE SCIENTIFIC SPOTLIGHT *****

1894 The British comparative psychologist **Conwy Lloyd Morgan** [Wikipedia biography] publishes "**Introduction to Comparative Psychology**", in which he proposes what has come to be known as "**Lloyd Morgan's Canon**", which reads ...

"In no case may we interpret an action as the outcome of the exercise of a higher mental faculty if it can be interpreted as the exercise of one which stands lower in the psychological scale."

This is, upon inspection, a special case restatement of the 14th century **Occam's Razor** [Wikipedia factsheet], the rule that "entities are not to be multiplied beyond necessity"; that when you are faced with explaining the unexplained, the simplest explanations are usually the best. The impact of this meta-theory when applied to complex mental phenomena is that an explanation can only be classed as scientific if its theoretical propositions are conceptually parsimonious as well as objectively testable. At around the same time the German neurologist **Hermann Oppenheim** [<1889] publishes "**Lehrbuch der Nervenkrankheiten für Ärzte und Studierende**" [= "A Guide to Nervous Diseases for Physicians and Students"], in which he summarises neurological best practice. [THREAD = WW1 MILITARY MEDICINE AND COGNITIVE SCIENCE]

****** CLASSIC WW1 STRATEGY ******

1894 **Wireless Telegraphy, Telephony, and Broadcasting [IX - Marconi's Early Experiments]:** [...] Continued from 1893] Inspired by the demonstrations, advice, and encouragement given to him by **Augusto Righi** [<1893] and **Vincenzo Rosa** [<1893], **Guglielmo Marconi** [<1893><1895] privately experiments with electric sparks to generate Hertzian waves capable of being detected by an aerial and made to activate a bell or
1894 Alfred von Schlieffen [1891<=1905] presents the first draft of his blueprint for a rapid defeat of France - the famous "Schlieffen Plan". The key feature of the plan is that it must deliver a quick victory, thereby preventing war on two fronts (that is to say, against both France and Russia). The strategy is inspired in general terms by the Carthaginian victory at Cannae [=216BCE], and specifically by the Battle of Königgrätz [=1866 (3rd July)] (in which he himself had served) both of which made good use of right flanking movements. "The last man on the right," the planners quip, "must get his boots wet". "The enemy front," said von Schlieffen, "is not the goal of the principal attack [... rather] it is essential that the flanks be crushed". Even Paris is not to be taken, but rather by-passed and surrounded. Similarly, industry is not to be taken over because there would be no time to use its spare capacity. And of course Paris would be the natural focus for a French last stand but the Prussians had already successfully laid siege to the city back in 1870. [THREAD = WW1 GRAND STRATEGIES]

ASIIDE: It is not known whether there were any fundamental military weaknesses in the plan because by the time it was put into effect it had been significantly watered down. Politically, however, the plan conveniently ignored the 1839 Treaty of London [=1839], whereby Britain had guaranteed the "perpetual neutrality" of Belgium, for it was through Belgium that the all-important "men on the right" would have to pass.

1894 [not specifically dated] Zionism Pre-WW1 [VII - Hechler's Tract]: [Continued from 1886 (undated)] Still pursuing the argument that the Jews belong in Palestine William Hechler [1882 (1st January)<=1896 (10th March)] now publishes a pamphlet entitled "The Restoration of the Jews to Palestine", in which he argues in favour of exactly that (sub-thread continues at 1896 (1st February) ...]. [THREAD = THE BATTLE FOR HEARTS AND MINDS] [THREAD = THE SHAPING OF THE MODERN WORLD]

1894 [30th March] Elliott Brothers [1893 (22nd June [ASIDE])<=1902] publish an article in The Engineer [full text online] explaining how their patented devices can replace a mechanically linked engine-room telegraph with an electrically linked one, thus greatly simplifying the communication between engine-room and bridge. [THREAD = WW1 CYBERNETICS, COMPUTATIONAL SCIENCE, AND FIRE CONTROL] [THREAD = THE WW1 FINANCIAL AND ARMSMENT INDUSTRIES]

1894 [30th June] London's iconic Tower Bridge [Wikipedia factsheet] is opened for traffic. [THREAD = THE SHAPING OF WW1 EUROPE]

************** HERTZIAN WAVE WIRELESS TELEGRAPHY ARRIVES **************
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1894 [14th August] Wireless Telegraphy, Telephony, and Broadcasting [X - The Lodge-Muirhead Demonstration]: [Continued from 1894] [Sir] [1893<=1897 (10th May)] and Alexander Muirhead [Wikipedia biography] [1893<=1897 (10th May)] successfully demonstrate the transmission of a wireless signal between the Clarendon Laboratory [map, etc.], Oxford, and the Oxford University Museum of Natural History some 150 metres distant (continues at ??th November) ...]. [THREAD = WW1 SIGNALLING AND TELECOMMUNICATIONS]

1894 [10th October] The newly extended Lewisham Union Workhouse opens as Lewisham Hospital [Wikipedia factsheet]. [THREAD = WW1 MILITARY MEDICINE AND COGNITIVE SCIENCE]
ASIDE - LEWISHAM MILITARY HOSPITAL IN WW1: As a military hospital Lewisham could accommodate 24 officers and 838 other ranks, including small numbers of prisoners-of-war and psychiatric cases when necessary.

1894 [15th October] The "Puteaux 75" Project [IV - The Dreyfuss Affair]: [...] Continued from 1892 (13th July) The French artillery officer Alfred Dreyfuss [Wikipedia biography] is arrested on suspicion of espionage. He will be convicted a month later and sentenced to life imprisonment. It will soon emerge, however, not only that Dreyfuss is innocent but also that an institutionally anti-Semitic military establishment has deliberately covered up the injustice. The ensuing public scandal - the "Dreyfuss Affair" - is noteworthy in the present context because the target of the espionage is the top secret Puteaux 75 project. Meanwhile trial firings of the new weapon are finding that the long-recoil mechanism is susceptible to leakage of hydraulic fluid. Joseph-Albert Deport [<=1892 (13th July)] is replaced as Project Director by Charles Étienne Saint-Claire-Deville [1891 (7th September)<=1896] and Émile Rimailho [Wikipedia biography] A young Austro-Hungarian journalist named Theodor Herzl [Wikipedia biography] Of Jewish descent, covers the events for his newspaper, and, into the bargain, becomes profoundly concerned at the depths of anti-Semitism in France [continues at 1896 ...]. [THREAD = WW1 ESPIONAGE AND INTELLIGENCE] [THREAD = WW1 ARTILLERY]

1894 [26th October] Leo von Caprivi [<=1890 (18th March)] is replaced as Chancellor of Germany by Prince Chlodwig of Hohenlohe-Schilligfürst [Wikipedia biography] [1891 (??th September)=1900 (17th October)]. [THREAD = THE SHAPING OF WW1 EUROPE]

1894 [1st November] Upon the death of Alexander III of Russia [<=1892 (17th August)] the imperial throne passes to his son Nicholas II of Russia [1868 (6th May)=1901 (21st June)]. [THREAD = THE SHAPING OF WW1 EUROPE]

ASIDE - NICHOLAS II IN WW1: Stated briefly, Nicholas II's support for Serbia against Austria-Hungary helps start WW1 and he is then assassinated when Russia exits the war during the Revolution of 1917.

1894 [15th November] The Chilean Navy ship Esmeralda [<=1884 (16th October)] is sold to Japan to serve as HIJMS Izumi [=>scrapped 1912]. [THREAD = THE WW1 SURFACE FLEETS]

1894 [??th November] Wireless Telegraphy, Telephony, and Broadcasting [XI - The Calcutta Demonstration]: [Continued from 14th August] The Indian physicist Jagadish Chandra Bose [Wikipedia biography] demonstrates the generation of a high frequency Hertzian wave capable of being detected at the other side of the room by a home-made Branly radio-conductor [<=1893] and there being used to complete a circuit (he uses the trick to set off gunpowder genies or ring bells). Bose calls the transmitted energy Adrisya Alok [Bengali = "invisible light"] [continues at 1895 (??th September) ...]. [THREAD = WW1 SIGNALLING AND TELECOMMUNICATIONS]

1894 [5th December] [...] Continued from 1884 (9th June) The Reichstag is completed. [THREAD = THE SHAPING OF WW1 EUROPE]

*************** 1870-1894 SUMMARISED ******************
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Much has changed in the 24 years reported in the present chapter. It has been a period of intense technical and cultural innovation, part of what is nowadays referred to as la Belle Époque. It began with France and Germany at each other's throats but has ended with
operetta, the Naughty Nineties, museums as big as cathedrals, fairground wheels as high as hills, the electron, and of course the beginnings of wireless. France has given us Impressionism, art nouveau, and the Folies, but has also woven together a strongpoint at Verdun capable of keeping an empire at bay [and it will shortly have to do exactly that]. The Russians have their brand new Tsar and are desperately trying not to be left on the fringe of things. The Ottoman Empire has continued to lose ground against both the Austrians and the Russians, and the Austro-Hungarians have been exposed as out of touch and bumbling compared to the Germans. America, meanwhile, continues to build its industrial powerbase, sucking in (and carefully documenting the arrival of) millions of people with hearts full of hope and just enough cash in their pockets to buy a steerage ticket on one of the new fast liners. But the ancient hatreds are all still there, but heightened now by an increasingly romanticised view of ethnicity and nationhood. There is bad blood everywhere, from the Pashtun in Afghanistan to the Minnecongou Sioux to the backstreets of Dublin. And the central problem for 1894 is that in an attempt to keep all these various tensions in check diplomats have tied themselves up in a web of treaties and alliances, so that if war should come on one frontier it is guaranteed to spread to all the others.

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