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# **The Victorians: Religion and Science Transcript**

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## The Victorians: Religion and Science

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The Victorian Age was beyond doubt a religious age. Under the impact of the excesses of the French Revolution, the Reign of Terror and the wars of Napoleon, the skepticism and rationalism of the Enlightenment had given way to a renewal of Christian faith. The historian J. A. Froude **(1)** was expressing a widely held view when he declared that “an established religion...is the sanction of moral obligation; it gives authority to the commandments, creates a fear of doing wrong, and a sense of responsibility for doing it...to raise a doubt about a creed established by general acceptance is a direct injury to the general welfare.” Correspondingly, any decline in religious belief amongst the new industrial working classes was “fraught with grievous danger to property and the State”, as one commentator remarked, and it was widely believed that the scepticism of the Enlightenment *Philosophes* had led directly to the horrors of the French Revolution.

Many Victorians believed that the Bible was the best, indeed in many cases the only guide to a moral life. They saw the hand of God in every event, indeed Disraeli once complained after being worsted by Gladstone in a debate that the really irritating thing about his great rival was not that he always had the trump card hidden in his sleeve, but that he evidently believed that God had put it there. **(2)** Success was seen as the reward of virtue, not least of course by the successful; failure as the punishment of vice. Attitudes to death, as I argued in a previous lecture, were fundamentally Christian in the High Victorian period. The dead did not cease to exist; they were merely going to a better place, or so it was hoped.

Churches were crowded with parishioners [and although some complained that industrialization and urbanization were alienating the masses from religion, there was scant evidence for that in church attendance figures. When the first national census revealed in 1851 that no fewer than 5 million people had not attended church the previous Sunday there was much shaking of heads among the pious; but of course this did not mean they failed to attend every Sunday, nor that they had ceased to believe in God. Church and chapel attendance did not fall between 1851 and 1881, and in absolute terms actually grew up to around 1906, though it fell relative to the population. Nevertheless, religion was to be found everywhere. Chained bibles were to be found on railway stations; sermons were regularly printed and sometimes became best-sellers; huge and highly popular efforts were made to bring Christianity to the heathen, especially if they lived in the British Empire, and missionaries like David Livingstone became household names. **(3)**

Of course, the Victorians were not unaware of the dangers of an excess of religious dogmatism and enthusiasm, evidenced for the upper classes in the Puritan Revolution of the seventeenth century; and the more intellectual amongst them knew that the literal truth of the Bible had been challenged by German scholars such as David Strauss, whose *Life of Jesus*, published in German in 1835 and in an English translation by George Eliot in 1846, **(4)** was described by the Evangelical reformer Lord Shaftesbury as “the most pestilential book ever vomited out of the jaws of hell. Using modern methods of textual criticism, Strauss dismissed the miraculous elements in the Gospels as mythical along with the allegedly Divine nature of its subject, and demonstrated how little hard evidence there actually was for the historical Jesus. Just as disturbing was the demonstration in Sir Charles Lyell’s three-volume *Principles of Geology*, published in 1830-33, **(5)** that there was no evidence for Noah’s Flood and the world had not been created on the eve of 23<sup>rd</sup> October 4004 B.C. as claimed by the seventeenth-century cleric James Ussher, but was far, far older.

As a result, Victorians tended to take refuge in the idea that religion was the only way to explain the world of nature, expressing a belief that nowadays would be called intelligent design. A series of treatises published in the 1830s argued “that design and benevolence were everywhere visible in the natural world”, a belief put to practical effect by the man who commissioned them, the eighth Earl of Bridgewater, who dined in his stately home with dogs and cats dressed up as men and women, with shoes and britches, provided with table napkins and each attended by a waiter. In this view of things, science could only serve to confirm the rational intricacy of God’s creation and the divinely sanctioned order of things. “Truth”, remarked the Cambridge geologist Adam Sedgwick **(6)** in 1845, “and it is most delightful when it reaches us in the form of some great abstraction which links together the material and moral parts of nature.” “Science”, as the reforming politician Thomas Brougham wrote, “teaches us to look on all earthly objects as insignificant and below our notice except the pursuit of knowledge and the cultivation of virtue – that is to say, the strict performance of our duty in every relation of society.”

Of course the problem with the idea of design was that it had to accommodate events like the French Revolution, but divinely sanctioned morality could have no meaning without humanly or diabolically inspired immorality, as Bishop Butler had once explained; thus, once more, suffering was likely to be a divine punishment for straying from the paths of righteousness. Evangelical religion inspired men and women to seek to prove themselves by good works, by helping the poor, reforming the world, and spreading the Gospel to the heathen. Alternatively, perhaps, like Thomas Arnold, **(7)** Victorians considered that it was sent by God to test the faith of the believer, a view he held so fervently that he wrote on his deathbed that ‘I have suffered so little pain in my life, that I feel it is very good for me; now God has given it to me, and I do so thank Him for it.’

Yet the recovery of faith in early nineteenth-century Britain did not mean that Christianity was either confident or unchallenged. Challenges came from a variety of sources, of which the atheism of the eighteenth-century Enlightenment was perhaps the least influential. The most public and hotly disputed challenge to the established religion of the Church of England came from rival versions of the Christian faith, and this meant in the first place Roman Catholicism. Ever since the sixteenth-century Reformation, the English and following them the Scots and Welsh had regarded Catholicism as a form of national treachery, and only gradually had opinion softened as the threat of invasion by Catholic powers like France and Spain receded. Catholics like Protestant dissenters had long been barred from public office, which was reserved for fully paid up members of the Church of England, but in 1828 and 1829 these restrictions were removed by Act of Parliament, not least in the Catholic case to defuse mounting tension in Ireland. So inflamed were parliamentary passions that the Duke of Wellington, the Prime Minister who had introduced the legislation, fought a duel against the Earl of Winchelsea, who had accused him of plotting to destroy the Protestant Constitution of the United Kingdom (both men deliberately missed and honour was satisfied) – the incident was a gift to the cartoonists. **(8) (9)**

Catholic Emancipation, as it was known, opened the way to the wider reforms of the 1830s, the greatest of which was the extension of the franchise and the rationalization of the electoral system in the great Reform Act of 1832. While the campaign for reform was strongly supported by Nonconformists and Dissenters, who were strong in the new industrial areas of the midlands and the north, it was vehemently opposed by the Church of England bishops who had seats in the House of Lords. A growing number of Anglican clerics saw these developments as threatening, especially when the government reduced the number of Irish bishops and proposed to secularise some of their revenues, following this with the commutation of church tithes, the legalization of civil marriage and marriages carried out in Dissenting chapels, and the establishment of a permanent Ecclesiastical Commission to reform diocesan administration, all in 1836.

A group of Anglican clerics centred round the University of Oxford **(10)** and led by John Henry Newman, John Keble and Edward Pusey began publishing a series of tracts in which they accused the Whig government of 'national apostasy' and parliament of a 'direct disavowal of the sovereignty of God' by interfering with the Church and extending rights to Dissenters. As one of them, William Palmer, complained, looking back on these events half a century later:

We knew not to what quarter to look for support. A Prelacy threatened, and apparently intimidated; a Government making its powers subservient to agitators who avowedly sought the destruction of the Church. The state so long the guardian of that Church now becoming its enemy and its tyrant. Enemies within the Church seeking the subversion of its essential characteristics and what was worst of all – *no principle in the public mind to which we could appeal.*

The Tractarians, as they were known, regarded the Church of England as a branch of the universal Church led by the Pope. They campaigned for the greater use of ritual, vestments and Catholic observances in the church, and aroused increasingly vehement opposition: Pusey for instance was banned from preaching for two years. Eventually, and following his own logic, Newman joined the Roman Catholic Church in 1845, later becoming a Cardinal. Though neither Keble nor Pusey followed him into the Catholic Church, the movement was not to be stopped, and in 1851, following an order by the Privy Council to reinstate an evangelical Anglican vicar who had denied the real effect of the sacraments (in this case, regeneration through baptism), another prominent Anglican, Henry Edward Manning, also converted, later becoming Cardinal-Archbishop of Westminster and heading the newly established Catholic hierarchy in England. **(11)**

These events agitated Victorians far more than would seem reasonable to a more secular age. They occasioned a vast outpouring of tracts, pamphlets, speeches and commentaries. They went hand in hand with wider cultural aspects of a return to Gothic medievalism, exhibited above all in the deliberate neo-medievalism of the architect Augustus Pugin, and celebrated in the secular world with the overtly Gothic style of the Palace of Westminster, **(12)** reconstructed after the old one burnt down in 1834. The turn to the Gothic and the Catholic was among other things an attempt to rekindle spirituality in an age widely seen as secular and lacking in faith; a reaction to a perceived crisis of the Christian religion. Yet much of what the Tractarians objected to was fervently religious too, even though the form it took was not acceptable to Anglo-Catholics.

Dissenting religion had roots in the seventeenth century, but really achieved widespread popularity with the industrial revolution. The Methodist movement, for instance, founded by John Wesley in 1739, numbered 57,000 members on his death in 1791, and reached 489,000 by 1850. There were evangelical revivals in Wales and Scotland, and sects such as the Baptists and Unitarians won mass adherence in mining and industrial districts across Britain. Among agricultural labourers too, the turn to Nonconformity was unmistakable, as the proliferation of primitive Methodist chapels across Norfolk testified. However much they differed in points of doctrine, all these sects emphasized a simple form of religion, dependent on the Bible, shorn of ritual, and dependent above all on open-air sermons to attract support. **(13)** These were emphatically the churches of the lower classes, often presenting the spectacle of mass hysteria in the revivalist meetings that led to conversion. Heaven and hell were always close to the Evangelical mind, God was always present in everyday life, and the rationalism of eighteenth-century religion was replaced by an emotionalism similar in degree though diametrically opposed in doctrine to that of the Anglo-Catholic movement.

Nonconformity emphasized above all the need for a sober and orderly lifestyle; Evangelical preachers denounced

drunkenness and advocated total abstinence, along with the abandonment of cruel and violent sports, gambling, riotous behaviour, and sexual indulgence. The demon drink was the instrument of the devil, driving men insane and pulling them down to the torments of Hell. **(14)** All this opened the way to self-improvement for the working classes; from one point of view, all this could be a means of inculcating the habits of hard work, regularity and sobriety that capitalism required of the new industrial workforce, combined with a predestinarian submission to the grim realities of everyday life; from another, however, it was a spur to democratic reform in the political world, it encouraged reading and education, and it engendered a sense of self-respect among workers when employer paternalism was being replaced by the ruthless exploitation of industrial capitalism. A sober-living God-fearing Methodist worker could feel morally superior both to the spendthrift aristocrat and the self-indulgent bourgeois. As the Baptist leader Robert Hall **(15)** said:

We see whole kingdoms...start from their slumber, the dignity of man rising up from depression, and tyrants trembling on their throne...Man seems to be becoming more erect and independent. He leans more on himself, less on his fellow creatures. He begins to feel a consciousness in a higher degree of personal dignity and is less enamoured of artificial distinction.

Nonconformity thus had a powerful political potential that eventually found its way into the trade unions and the labour movement. As Keir Hardie, founder of the Labour Party, declared: "I myself have found in the Christianity of Christ the inspiration which first of all drove me into the movement and has carried me on in it."

Evangelical religion involved a strong dose of millenarianism, in which prophecies of the end of wickedness, the Second Coming of Christ, the end of the world, and the last Judgement, offered a satisfying counterweight to the injustice and exploitation of the present. Apocalyptic visions were present in the popular, much-reproduced paintings of John Martin, **(16)** and found their ultimate expression in the movement founded by the prophetess Joanna Southcott, who wrote sixty-five books of *Prophecies* between 1792 and 1814, sealing each for a prescribed number of years: when she died, her followers refused to bury her body until it began visibly to decay, in the belief that she would rise from the dead. **(17)** Her successor John or Zion Ward, a shoemaker, enthralled huge crowds with his rhetoric until he had over 100,000 followers. Southcott left behind her a black box of prophecies, to be opened only in time of national crisis in the presence of 24 bishops. After failing to persuade the bishops to open it in the Crimean War and the First World War, the Southcottians eventually got a bishop to unlock it in 1927, when it was found to contain a lottery ticket, a pistol, and assorted other items but no prophecies. However, the Southcottian Panacea Society claims it was the wrong box, and still possesses another one that has yet to be opened. **(18)**

By mid-century, however, religious fervour of this kind had declined sharply, and the dangers to Christian faith seemed to have become more acute than ever. Yet those intellectuals who abandoned religion at this time were in a small minority and did so largely because they found the religious intolerance and dogmatism that characterized all sides in the debates of the first half of the century unacceptable; and, crucially, by 1850 or so, in the high noon of mid-Victorian liberalism, it was less dangerous, less sensational than it had been earlier in the century to renounce one's faith and declare one's agnosticism, as James Mill and George Grote did.

Yet in the longer run, the greatest threat to faith was to be posed by science. To begin with, as Victorians initially reacted to the work of men like Lyell or Strauss by taking refuge in a naturalistic theology which posited the existence of a grand divine plan of nature, putting human beings, the only creatures endowed with a soul, at the centre of God's design, they sought to deal with further scientific discoveries by incorporating them into this system of belief. God of course had created everything at one go, in an appropriately perfect and immutable form. As Adam Sedgwick said in 1845: "As a matter of fact, species do not change, and the fixed organic laws of nature are the first principles of physiology; in the same way that the fixed laws of atomic combination are the first principles of philosophical chemistry."

But it became increasingly difficult to uphold this view. Robert Chambers's anonymously published book, *Vestiges of the Natural History of Creation*, published in 1844, laid out a description of the natural world that began with the solar system and ended with the emergence of humanity, asserting that human beings were simply one kind of animal, 'considered zoologically, and without regard to the distinct character assigned to him by theology', along with others, some of which had, like the mammoth, become extinct. **(19)** As Sedgwick declared: "'...If the book be true, the labours of sober induction are in vain; religion is a lie; human law is a mass of folly, and a base injustice; morality is moonshine; our labours for the black people of Africa were works of madmen; and man and woman are only better beasts!'"

Yet the scandal caused by the book had largely dissipated by the 1850s. Following on the defeat of Chartism, the dangers of revolution finally seemed to be receding, and with them the need for religion as a guarantor of order. In the 1840s, the naturalist Charles Darwin, who had collected fossils and observed the variety of species on the Galapagos Islands during his voyage on *The Beagle* from 1831 to 1836, had kept silent about the theory that he built on his observations, the theory of evolution by natural selection and adaptation of the species most suited to their changing natural surroundings, because he feared that it might undermine religion and incite unrest; a view confirmed by the hostile reception accorded to Chambers's work in 1844. **(20)** Darwin satisfied himself that his work was not a threat to religion:

The contemplation of the works of the creation [he wrote in 1844] necessarily leads the mind to that of the Creator himself...[The naturalist] traces, from the bulk and strength of the massive elephant to the almost

invisible structure of the minutest insect, a mutual dependency, that convinces him nothing is made in vain. He feels too, that at the head of all this system of order and beauty, pre-eminent in the dominion of his reason, stands Man. He sees himself the favoured creature of the Creator...

Darwin in other words came to feel that his work would strengthen natural theology rather than challenge it.

Prompted by the threat of being scooped by another naturalist, Alfred Russel Wallace, who had independently come to similar conclusions, Darwin finally published *The Origin of Species* in 1859. It opened with the boldest possible statement that "the view, which most naturalists until recently entertained, and which I formerly entertained - that each species has been independently created - is erroneous." Species had not been made in their final form by God but changed and evolved over time. Sometimes, as with dogs or racehorses or racing pigeons, this could be done by deliberate breeding, but overwhelmingly it happened naturally. For Darwin, this was a cause for optimism, as evolution would proceed further "towards perfection", and his linkage of evolution to mid-Victorian optimism, along with his manifestly Christian interpretation of the natural order and the preparatory work done by Chambers and Lyell, softened the blow to religion struck by the publication of his book. Moreover, this was a scientific work, not a popular tract, so its immediate impact was correspondingly limited.

Yet Darwin's work none the less aroused the accusation that by taking morality out of nature he had degraded humanity into the mere product of mechanical processes. And in the biologist Thomas Huxley he inspired an enthusiasm for propagating his ideas that quickly brought them widespread publicity. In 1860, Huxley debated Darwin's theories with Samuel Wilberforce, the Bishop of Oxford, at the British Association for the Advancement of Science. **(21)** According to a later account:

The Bishop rose, and in a light scoffing tone, florid and he assured us there was nothing in the idea of evolution; rock-pigeons were what rock-pigeons had always been. Then, turning to his antagonist with a smiling insolence, he begged to know, was it through his grandfather or his grandmother that he claimed his descent from a monkey? On this Mr Huxley slowly and deliberately arose. A slight tall figure stern and pale, very quiet and very grave, he stood before us, and spoke those tremendous words - words which no one seems sure of now, nor I think, could remember just after they were spoken, for their meaning took away our breath, though it left us in no doubt as to what it was. He was not ashamed to have a monkey for his ancestor; but he would be ashamed to be connected with a man who used great gifts to obscure the truth. No one doubted his meaning and the effect was tremendous. One lady fainted and had to be carried out: I, for one, jumped out of my seat.

As all this suggests, the debate made Darwin and his theories famous. Soon caricaturists were depicting him as an ape, **(22)** underlining the threat that his theories seemed to pose to religion, for if evolution by natural selection were true, then at what point in evolution had humans acquired a soul? **(23)** As the debate raged, so cartoonists began to use it in political caricature too, as in this cartoon of Disraeli by Sir John Tenniel, reporting Disraeli's speech in Oxford in November 1864L "The question is," Disraeli asked, "is man an ape or an angel? Now, I am on the side of the angels." **(23)**.

Thus whether Darwin liked it or not, the popular debate on his theory of evolution pitted evolutionism was pitched against creationism, facts against faith. And facts, and the positivist belief in the supremacy of facts, were central to the Victorian belief system. "Now, what I want is," says Mr Gradgrind in Charles Dickens's *Hard Times*, published in 1854: **(25)**

Facts. Teach these boys and girls nothing but Facts. Facts alone are wanted in life. Plant nothing else, and root out everything else. You can only form the minds of reasoning animals upon Facts: nothing else will ever be of any service to them. This is the principle on which I bring up my own children, and this is the principle on which I bring up these children. Stick to Facts, sir!

Positivism, the doctrine developed by the French thinker Auguste Comte **(26)** in the 1840s, and made available in English in his major work *A General View of Positivism*, in 1865, held that scientific observation was the only legitimate basis for action. *A priori* beliefs had to be jettisoned; only what could be seen, what could be verified, was true. The champions of Christian faith would have none of this. As one of them wrote mockingly:

There was an ape in days that were earlier;

Centuries passed and his hair became curlier;

Centuries more and his thumb gave a twist,

And he was man and a Positivist.

Facts, the Positivists believed, were out there waiting to be discovered. The enticing prospect opened up of a time in the future when every fact would be known. And if the scientific method was applied to every discipline, then all the facts would be known about everything. History, for example, should, in the view of Lord Acton, Regius Professor in Cambridge at the end of the century, satisfy 'the scientific demand for completeness and certainty'. **(27)** Indeed some considered this already to be the case in some fields. When the young German scientist Max Planck asked his supervisor for advice on whether he should embark on doctoral research, for

instance, he was told firmly that it was a bad idea, since everything that there was to be known in Physics had already been discovered.

Such optimism reflected the fact that in the Victorian era, science was becoming professionalized. Once the domain of gentlemen of independent means, of intellectual clergymen and gifted amateurs, science moved into the universities, previously devoted mainly to preparing young men for service in medicine, the law, or the church; but progress was slow. The term 'scientist' was only coined in 1834, and the Cambridge Natural Sciences Tripos was founded in 1851 and only gradually gained in popularity. Laboratories earlier in the century existed not in the universities but in establishments like the Royal Institution (as in this illustration showing Michael Faraday at his bench) **(28)**. Kelvin's laboratory at Glasgow university was set up in mid-century in a disused wine cellar and the adjoining coal cellar where, as one of his students complained,

there was no special apparatus for students' use in the laboratory...no special hours for students to attend, no assistants to advise or explain, no marks given for laboratory work, no workshop, and even no fee to be paid....students experimented...in spite of the atmosphere of coal dust, which settled on everything, produced by a boy coming periodically to shovel up coal for the fires.

Only in 1874 did Cambridge establish a purpose-built physics laboratory, named after the Chancellor of the university, William Cavendish, Duke of Devonshire. **(29)** This underlined the importance of British research in theoretical physics, where Thomson, Rutherford and Clerk Maxwell led the field.

By this time standard procedures were being developed in teaching and research – dissection in biology, for example, standard experiments in physics and chemistry following textbooks replaced the old system whereby students had set up whatever experiments they fancied, often with disastrous results. Soon technical assistants were being appointed and standardized equipment manufactured, taking advantage of the opportunities offered by the new world of industrial production. Microscopes and telescopes became more sophisticated, chemical dyes made it easier to observe microbes and bacilli, and by the end of the century scientific research and education were recognizably similar to what they are today. Science began to become incomprehensible to the layman as it became more specialized. This was not all good news for Victorian Britain, the land of the gifted amateur, where scientific training lagged behind Germany and other Continental countries. The greatest medical discoveries of the age were made by Pasteur and Koch, not by British researchers.

British chemists in particular went to German universities to get a PhD, and the science-based chemical and electrical industries were more advanced in Germany than in Britain. This already began to have economic effects by the end of the century; and the gap was signaled in popular culture by the new image of the scientific professor, who almost invariably spoke with a guttural accent as he was preparing malodorous concoctions and dangerous explosions. By the end of the century, too, the new *genre* of science fiction was gaining in popularity, with H.G. Wells publishing both *The Time Machine* and *The War of the Worlds* in the 1890s; but scientosts *in* fiction were still often foreign, a tradition going back to Mary Shelley's *Frankenstein* and found in Joseph Conrad's *The Secret Agent*, whose 'the professor' is constantly wearing a belt made of explosives, or, in another form, in Arthur Conan Doyle's Sherlock Holmes stories, where the detective has clearly received his scientific training in Germany, or possibly Austria, but certainly not in Britain.

What science offered by the late nineteenth century was the exploration of the natural world in all its aspects, the collection and interpretation of newly discovered facts; and exploration and discovery were central to the Victorian concept of knowledge, turning explorers like Burton and Speke into national heroes, **(30)** their exploits in the search for the African Great Lakes and the source of the River Nile in the late 1850s and early 1860s into almost a national obsession and their reports to the Royal Geographical Society into major media events. As exploration opened up the continents of Africa, Asia and Australia to European knowledge, attention turned to the North and South Poles. Robert Falcon Scott who died in his ill-fated journey back from the South Pole in 1912 became another national hero, **(31)** his story learned by every Edwardian schoolboy. Soon, these expeditions promised, the whole of the world would be discovered and there would be nothing more to be discovered about it.

While astronomers explored the solar system and the universe, medical scientists explored the world of germs and microbes, discovering the causes of a whole range of diseases, though very seldom moving on from this to work out a cure for them. The human body too was open for exploration, and soon scientific methods were being applied to the human spirit as well. The lead here was taken initially by the new science of phrenology, developed early in the century by Franz Gall and Johann Spurzheim, who lectured in Edinburgh and passed on his method to George Combe, whose writings on the subject were crucial to its popularization in England. Combe's book *The Constitution of Man, Considered in Relation to External Objects*, published in 1828, had sold 300,000 copies by 1859, making it by one estimation the fourth-best-selling book of the second quarter of the century after the Bible, *Pilgrim's Progress* and *Robinson Crusoe*. At the height of its popularity, phrenology was popularized by more than 200 lecturers touring the country spreading its tenets to mechanics' institutes, where it was particularly popular. It was democratic too, since anyone could master its basic principles, so it was a form of what might be called popular rather than professional science.

Phrenologists believed that the mind was made up of a variety of different mental, spiritual and moral faculties, each located in a different part of the brain. **(32)** Each individual possessed these faculties in a different combination and to different degrees, and this was reflected in the size of the area each faculty occupied in the

brain, so that you could measure a person's personality structure by measuring the area of the skull overlying each particular faculty, or rather, where the phrenologists thought the faculty was located. Combe (seen here giving a lecture in 1826) **(33)** believed that the individual could work to improve himself and thereby alter the pattern of bumps on his head, and he encouraged thrift, orderliness, punctuality, hard work and cleanliness, so it is not surprising that it was popular in the age of headlong industrialization. Yet it declined sharply after 1850, as the arbitrariness and medical absurdity of its central tenets became steadily more apparent. As science and medicine became more professionalized, phrenology came to be classified as a pseudo-science, and tellingly, it was formally rejected by the British Association for the Advancement of Science, founded in 1831.

What replaced it to some extent was another Continental import, the doctrine of animal magnetism or mesmerism, devised by the Austrian doctor Franz Anton Mesmer in the 1790s and popularized by French physicians in the 1820s. It became popular in a series of experiments carried out by Dr John Elliotson at University College Hospital London in 1837 on two domestic servants who suffered from hysteria and epilepsy: **(34)** Elliotson claimed to cure them by passing an invisible magnetic fluid from his own body to theirs, thus warming them up and driving the ailment away. Mesmerism, or what we would nowadays call hypnosis, quickly gained currency in a wide variety of social circles, though it was discredited when it was revealed that Elliotson's subjects had in fact been pretending all along; doctors quickly abandoned its use in operations, common in the early 1840s, and turned instead to chemical anaesthesia instead, with the first operation under ether being conducted at University College Hospital in 1846. Putting the patient under not only guaranteed that the operation would really be painless but also restored the surgeon's authority by making it no longer dependent on the patient's co-operation. **(35)**

In the second half of the century these methods began to give way to a variety of new theories of the mind, as psychology cut loose from philosophy and began to divide into experimental physiological investigations of the brain and the nerves on the one hand, and intelligence and perception testing on the other. Most of the running here was made by American, French and German scientists, and by the end of the century new theories of individual human behaviour were beginning to emerge, notably in Vienna, where the neurologist Sigmund Freud began to develop the theories and techniques of psychoanalysis from the 1880s onwards. Freud began by using hypnosis, and only later went on to use the talking method to release the repressed emotional energies of his patients on the consulting couch.

The links between Freudianism and mesmerism are obvious, but so too are their links with religion, with the surrender of the mind and soul to a higher power, and the cathartic effects of confession. Science met religion in other ways too, as Max Planck and then Albert Einstein exploded the certainties of the Newtonian universe at the turn of the century, undermining Victorian positivism by destroying the idea of an objective observation of discrete facts through the idea of the relativity of the observer. The universe could no longer be understood in simple material terms, and by the end of the Victorian era, the world had become more mysterious, not less. And the attempt to apply scientific methods to human society seemed to have fallen foul of rival theories and approaches that made for more doubt and contention, not less. One of the most contested of these areas was that of race, and that, together with the rise of Empire in the Victorian period, will be the topic of my next and final lecture, on April 11<sup>th</sup>.