

More on DNA fraud . Double Helix resembles Milky Way as in helios centric /kabbalah cosmology , hermeticism ..

Rosalind Franklin , great great grandniece of Mayer Amschel **Rothschild**. **Why** her , except 4 or 5 & family photos are missing . Fictional personality ? Francis Crick & James DEWEY Watson (related to John Dewey ?) supposedly plagiarised , stole Rosalind's work. Rosalind died at the age of 37 . flip & turn 37 to get EL . Rosalind was from a **major hereditary banking** , freemasonry family . Her last months she stayed with Crick & his wife Odile , who were into narcotic drugs , alchohol , group sex orgies , nude parties – great scientists ? . Odile was into nude paintings , which were exhibited by Crick in Salk Institute ,where polio vaccine was developed , when Crick was director at Salk – are we dealing with scientists / researchers ?? No one has seen any atoms /molecules .

Chargaff & Watson took the concepts from **quantum** physicist Erwin Schrödinger's **1944** book *What is Life?*

Freemasonry , **Military** , Rothschild / Queen of England are present in **everything major** . Be it “science” or **anything** . Role played by **Beit family** is suppressed . Major bankers present / control everything . Ultimately leading to **Rothschilds**.

Crick , Watson , Franklin and each & everyone involved were **theoretical , mathematical , statistical** scientists . Not real ones . Interpretations , definitions , calculations , assumptions prove , their sciences . **Not** direct observations . Mescaline / LSD opens intuition ? helps invention ? then how come , the results lead to **kabbalah** ??

The Theoretical Science Establishment Controls
Cosmological And Biological Sciences.

<https://www.scribd.com/document/273494332/Fixed-Earth-Theoretical-Science> **except bible.**

“Geneticists, **James D Watson** and **Francis Crick**, a molecular biologist, biophysicist, and ... He famously threw **nude parties** throughout the 1950's and 60's. -- in --One Deception to Rule Them All –By- Gregory Lessing Garrett

& DNA pioneer James Watson stripped of honors over ‘reprehensible’ racist views By Jeremy Layton
January 14, 2019

<https://nypost.com/2019/01/14/dna-pioneer-james-watson-stripped-of-honors-over-reprehensible-racist-views/>

Crick, who died ten days ago, aged 88, later told a fellow scientist that he often used “small” doses of

*LSD, then an experimental drug used in psychotherapy to boost his powers of thought. He said it was LSD, **not** the Eagle's warm beer that helped him to unravel the structure of DNA, the discovery that won him the Nobel Prize."*

A Scientist Trippin' On LSD Discovered DNA... And His Breakthrough Was Not Alone

Without the creative application of psychedelic drugs, it is very possible that the iPod would have never been invented and DNA may have never been discovered. Francis Crick, the scientist credited with discovering DNA, was **taking psychedelic drugs** when he made his groundbreaking revelation.

The London-based periodical *Mail on Sunday* **reported** that after Crick's death in 2004, "*The abrasive and unorthodox Crick and his brilliant American co-researcher James Watson famously celebrated their eureka moment in March 1953 by running from the now legendary Cavendish Laboratory in Cambridge to the nearby Eagle pub, where they announced over pints of bitter that they had discovered the secret of life.*

Crick, who died ten days ago, aged 88, later told a fellow scientist that he often used "small" doses of LSD, then an experimental drug used in psychotherapy to boost his powers of thought. He said it was LSD, not the Eagle's warm beer that helped him to unravel the

structure of DNA, the discovery that won him the Nobel Prize.”

Years later, another scientist **and** LSD user by the name of **Kary Mullis** **advanced our knowledge** of DNA even further with the development of the polymerase chain reaction (PCR) technique, a process that made it possible for scientists to better study how DNA works. In his book, *Dancing Naked in The Mind Field*, Mullis said:

*“A person who loved playing with chemicals as much as I did just couldn’t help but be intrigued by LSD. The concept that there existed chemicals with the ability to transform the mind, to open up new windows of perception, fascinated me. I **considered** myself to be a serious scientist. At the time it was still all very scholarly and still legal. There was no tawdry aura over it. People weren’t blaming their kids’ problems on it yet. Hippies had just started to differentiate themselves from beatniks and the difference seemed to be fewer years and more hair on the hippies. And they stayed in college.”*

Steve Jobs, the mind behind the first Apple computers, iPods, iPhones, and other revolutionary technology, frequently said his experiences with psychedelics were among the most important events in his life.

His **biography** quoted him on the matter:

“Taking LSD was a profound experience, one of the most important things in my life. LSD shows you that

there's another side to the coin, and you can't remember it when it wears off, but you know it. It reinforced my sense of what was important—creating great things instead of making money, putting things back into the stream of history and of human consciousness as much as I could.”

Steve Jobs wasn't the only technological pioneer who used psychedelics to boost creativity. Douglas Englebart, the inventor of the computer **mouse**, **was also** a psychedelic user.

<https://theantimedia.com/scientist-trippin-on-ld-discovered-dna/>

The image represents the base pairs of nucleic acids, twisted around a center **line** to show the **axis** of the helix. Francis Crick, James Watson and Maurice Wilkins were credited with the first **explanation** of DNA and its structure ..

Odile Circk wife of Francis Circk-- "You were always coming home and saying things like that," she said, "so naturally I thought nothing of it." .. She became an officer = SPY= in the Women's Royal Naval Service, and her proficiency in German brought her work as a code-breaker and translator of captured documents. .. She was stationed at the Admiralty defense complex in London when she first **met** Francis Crick, a SPY, scientist four years her senior working on military research, particularly magnetic and acoustic mines. ... After he became famous, the couple became known for

their **bohemian parties** at their Cambridge home, the Golden **Helix**. ... When he served as president of the institute, Francis Crick displayed his wife's paintings of **nudes** around the workplace. <https://www.post-gazette.com/obituaries/2007/07/22/Obituary-Odile-Crick-Drew-DNA-s-double-helix-for-husband-s-discovery/stories/200707220123>

Odile Speed Crick, 86; painter of nudes sketched the double helix of DNA

Odile Speed Crick, the bohemian painter of **nudes** whose most famous drawing was an illustration of DNA that appeared in a seminal paper by her husband, Francis Crick, and James Watson on its structure, died July 5 in La Jolla after a short illness. She was 86. Crick household was **filled** with her paintings of curvaceous women. She entertained Watson and Maurice Wilkins. as well as crystallographer Rosalind Franklin, whose X-ray images of the structure were crucial to Watson and Crick's efforts.

Throughout Crick's career, the **parties** at the couple's homes were a polyglot mixing bowl for scientists and **other** intellectuals.

The events usually featured a large alcoholic punch bowl, and the whiff of a **joint** was common. At one party, a nude woman reclined on a sofa as a model for guests.

Odile Speed was born in King's Lynn, England, on Aug. 11, 1920, the daughter of a jeweler and his French wife.

She joined the British Admiralty. Crick was working in the same office, studying circuits in German acoustic torpedoes.

Throughout her life, she painted primarily nudes. Among her subjects were her husband's secretaries and au pairs hired to look after the couple's children. Her **only other** scientific illustration was a drawing of a girl running that appeared in one of her husband's last papers, an article in Nature Neuroscience on consciousness.

<https://www.latimes.com/archives/la-xpm-2007-jul-21-me-crick21-story.html>

Odile Crick 1920 –2007 best known for her drawing of the double helix structure of DNA discovered by her husband Francis Crick and his partner James D. Watson in 1953.

French mother, Marie-Therese Josephine Jaeger and an English father, Alfred Valentine Speed, who was a jeweller. she drew structure of DNA for Nature in 1953. The sketch was reproduced widely in textbooks and scientific articles and has become the **symbol** for molecular biology.

Terrence J. Sejnowski of the Salk Institute for Biological Studies said, "It may be the most famous

[scientific] drawing of the 20th century, in that it defines modern biology."

In his memoir *What Mad Pursuit*, Crick said that she had told him later "You were always coming home and saying things like that, so naturally I thought nothing of it." .. The Cricks became **famous** for their **parties** in the 1960s either in Cambridge or at a cottage near Haverhill. The Odile Crick Memorial Exhibition of **her** art was held at the Salk Institute, La Jolla, on 12 October 2007.

https://en.wikipedia.org/wiki/Odile_Crick

‘I really don’t know what happened to Jim’: Friends ask where James Watson’s odious attitudes about **race** came from.....

After Watson’s many statements denigrating blacks, women, and others.....

In 2007, Watson told a British newspaper that he was “inherently gloomy about the prospect of Africa” because “social policies are based on the fact that their intelligence is the same as ours — whereas all the testing says not really.” Moreover, he continued, although one might wish that all humans had an equal genetic endowment of intelligence, “people who have to deal with black employees find this not true.”

Watson made his **one and only** important scientific discovery when he was only **25**. He discovered **nothing** of importance afterward.

When he joined Francis Crick at England's Cavendish Laboratory, Watson knew virtually **nothing** about molecular structures or "the basic fundamentals of the field," Jerry Adams, also one of Watson's graduate students, told a Cold Spring Harbor oral history project; Watson was "**self**-taught."

Scientists who have known and observed Watson for decades say he believed in finding truths in his **gut**.

"Jim is intuitive,"???? MIT biologist H. Robert Horvitz told the oral history project. His **gut** gave him "an uncanny sense of science."

Perhaps that's why Watson came to believe that his intuition about race and IQ and genetics was a stronger guide to truth than empirical research. "He believed what he believed and wasn't going to change his view," the lab colleague said. "As the scientific environment became even **less** hospitable to [the "Bell Curve" thesis], he became even more adamant."

Watson has told friends he cares deeply how history will see him. He cares what his obituaries will say. But not enough, apparently. Toward the end of the documentary, called "Decoding Watson," director Mark Mannucci asked if his views on race and intelligence have changed. "No," came the reply.

"To the extent that I've hurt people, of course I regret it," Watson added. "I like black people, so why would I want to hurt them?" But "there is a difference, on average, between blacks and whites on IQ tests," he said. And much as he "would like there to be new

knowledge” showing that environment and experiences have a greater influence on intelligence than genes, “I haven’t seen any.”

<https://www.statnews.com/2019/01/03/where-james-watsons-racial-attitudes-came-from/comment-page-4/>
<https://ourwayisthehighway.wordpress.com/2017/11/16/the-molecular-path-to-shamanism-francis-crick-and-the-double-helix-delusion/>

Crick Francis Harry Compton

Having with James Watson “discovered” the structure of deoxyribonucleic acid (DNA), Crick went on to play a central role in the **elucidation** of the genetic code and the mechanism of protein synthesis. These achievements won him a share in the Nobel Prize in Physiology or Medicine in 1962. Much sought after as a lecturer, he became the “molecular evangelist,” seeking to convert biochemists and biologists to the **new** science. He travelled extensively, broadcast on radio, and frequently wrote for *Scientific American*. His later years were spent in California, where he plunged into the complex world of **neuroscience**.

Crick was the firstborn of Harry Crick, boot and shoe manufacturer, and Annie Elizabeth Wilkins, the elder daughter of F. W. Wilkins, a gentlemen’s outfitter. == As in most cases , info on parents = missing.

Naval Research . Crick was among the six thousand scientists selected to support the armed forces as civilian scientists, and in 1940, he began work at the Admiralty Research Laboratory on the outskirts of

London. In the winter of 1942, he was one of a five-man team of physicists and mathematicians sent to Havant, close to Portsmouth.

Casting around for suggestions, he reflected on the principal subject matter of his scientific chats with colleagues. Instead of being physics it was biology: How do chromosomes perform their amazing “**dance**” in cell division? What is it that distinguishes a crystalline “**virus**” capable of reproduction from other organic crystals incapable of reproduction? What can neurophysiology reveal about the mystery of **consciousness**? “Obviously,” he confessed, “a disbelief in religious dogma was a very deep part of my nature” (Crick, 1988, p. 11).

A New Career: Crystallography . Cricks ambition was to learn the art of x-ray crystallography in order to study the structure of proteins, for in them surely lay the **secret** of life itself. The Medical Research Council (MRC) agreed to support him, however, **only if** he would first immerse himself in biology???. That meant studying the **whole** cell, not just extracted material.

After he spent two years at the **Strangeways** Laboratory fulfilling this requirement, his wish to study the structure of proteins was granted, and in 1949, he moved to the **MRC** Unit for the Study of the Molecular Structure of Biological Systems in Cambridge Universitys Cavendish Laboratory. There his first achievement was to administer a frontal attack on the methods of **interpretation** of x-ray data being used by

his **bosses**, Sir Lawrence Bragg **and** Max Perutz, in their brave attempt to find the structure of hemoglobin. Teaching himself, Crick had mastered the application of **Fourier theory** to the data of x-ray diffraction patterns. Now he possessed an unrivaled insight into the strengths and limitations of these Techniques and a remarkable ability to **visualize** molecular structures and their symmetry relations in space. This was manifested in his success simultaneously with **William Cochran** in deriving the main features of the x-ray diffraction pattern that a helical **molecule** should yield. Next he introduced the **idea** of supercoiling of helices to account for anomalous diffraction data from the α keratin of wool that had proved so **difficult** to accommodate in helical models.

Armed with this knowledge, Crick realized that conventional approaches to the structural **interpretation** of diffraction patterns have limited value when dealing with DNA fibers, for these consist of long chain molecules packed in a regular order only in the fiber direction. Therefore they lack the three-dimensional lattice of a single crystal. That said, there are strict limitations on the different conformations that long chain molecules can take because they are oriented and packed tightly together in the fiber direction. So it is possible to **guess** a plausible structure, predict its diffraction pattern and check this against the diffraction data **without** carrying out the traditional, lengthy **calculations**, and **without** knowing the phases of the reflections. **Linus Pauling's** success with his alpha

helix in 1951 was the classic example of **this** “stochastic method,” as Pauling called it.

---((Thomas Strangeways **Pigg** Strangeways (1866-1926) was a British pathologist, known for founding the Cambridge Research Hospital, which was renamed the Strangeways Research Laboratory ..studied under **Alfredo Kanthack** .. thanks to the support of **Otto Beit** and to its temporary repurposing as a hospital for military officers in World War I. .. learned about tissue culture techniques from **Alexis Carrel** ../// **Honor Fell** she would take over leadership of the laboratory following Strangeways' death in 1926...In the 1920s and 30s, the laboratory was the **only** British institution focused specifically on tissue culture technique,: the **utility** of which was a controversial topic among scientists of the time.[7] .. //// **Alfredo Kanthack** (1863-1898).. studied in **Berlin** under Wilhelm Krause, Rudolf Virchow; , Robert Koch .. one of his students, **Walter Myers** .. Kanthack is credited for the use of **formalin** as a histological fixative. .. //// **Walter Myers** was born on 28 March 1872 in Edgbaston, the **only** son of George Myers (b.1841) and Flora **Wertheimer** (1851-1921) granddaughter of Chief Rabbi Akiba Wertheimer **and** niece of German philosopher Constantin Brunner.v .. His firstborn nephew, **Walter Myers Churchill** (b.1907 d.1942) . under Professor Ernst Ziegler where he soon produced some further excellent work on cobra poisoning and the

development of **antivenom** serums, and his preliminary investigations on the action of the various forms of proteids and their antibodies were some of the most important contributions to the study of immunity at that time. He then went to **Berlin** under Professor **Robert Koch** .. Frankfurt under Professor Paul **Erhlich** ..

Myers accompanied fellow eminent Cambridge scientist, Dr Herbert Durham who led the **Yellow Fever Expedition** to Brazil. In 1881 the Cuban epidemiologist Dr Carlos **Finlay** was the **first** to **theorise** that yellow fever was transmitted by **mosquitoes**, but this remained **unproven** in the wider scientific community. .. U.S. Army Yellow Fever Commission, led by Dr **Walter Reed**, which **subsequently** confirmed Dr Finlay's theory. .. Herbert Edward Durham was born 30 March 1866, the son of Arthur E. Durham, Senior Surgeon to Guy's Hospital. He married Maud Lowry, daughter of **Capt.** Harmer of 81st Regiment. .. Durham was 48 at the outbreak of the First World War and served as Hon. Lieutenant in the Royal Army Medical Corps and Major in the Special List. ... Carlos Juan **Finlay** .. He reversed the order of his given names to "Carlos Juan" later in his life. His father was a physician who had fought alongside Simón **Bolívar** .. Finlay met John Kearsley Mitchell, a proponent of the **germ** theory of disease, and his **son** Silas Weir Mitchell, who supervised his studies. .. His **hypothesis** and exhaustive proofs were confirmed nearly **twenty years later** by the Walter Reed Commission of 1900. .. He then returned to Havana and set up an **ophthalmology**

practice in 1857 .. He was the **first** to **theorize**, in 1881, that a **mosquito** was a carrier, now known as a disease vector, of the organism causing yellow fever: a mosquito that bites a victim of the disease could subsequently bite and thereby infect a healthy person. He presented this theory at the 1881 International Sanitary Conference, where it was well received. A **year later** Finlay identified a mosquito of the genus *Aedes* as the organism transmitting yellow fever. .. In the words of General Leonard Wood, a physician and U.S. military governor of Cuba in 1900: "The confirmation of Dr. Finlay's doctrine is the greatest step forward made in medical science since **Jenner's** discovery of the vaccination [for smallpox]."(jenner was a freemason / fraud – discovered nothing) .. He received the National **Order** of the Legion of Honour of France in 1908. .. //// Major Walter **Reed**, M.D., U.S. **Army** (Sept 13, 1851 – Nov 22, 1902), was a U.S. Army physician ... Reed followed work started by Carlos Finlay **and** directed by George Miller Sternberg, who has been called the "**first** U.S. bacteriologist". Robert Koch honored Sternberg with the sobriquet, "**Father** of American Bacteriology". The same year—simultaneously with Louis **Pasteur** (Pasteur was a freemason / **fraud** – discovered **nothing**)—he announced the discovery of the pneumococcus, eventually recognized as the pathogenic agent of lobar pneumonia. He was the **first** in the United States to demonstrate the Plasmodium organism as **cause** of malaria (1885) and to confirm the **causitive** roles of the

bacilli of tuberculosis **and** typhoid fever (1886). He was the **first** scientist to produce **photomicrographs** of the tubercule bacillus. He was also the **earliest** American pioneer in the related field of **disinfection** in which he began with experiments (1878) with putrefactive bacteria. This work was continued in Washington and in the laboratories of **Johns Hopkins** Hospital in Baltimore, under the auspices of the American Public Health Association. ... Sternberg created the Typhoid Fever **Board** (1898), consisting of Majors Walter Reed, Victor C. Vaughan, and Edward O. Shakespeare, which established the facts of contact infection **and** fly carriage of the disease. In 1900 he organized the **Yellow Fever** Commission, headed by Reed, which ultimately fixed the transmission of yellow fever upon a particular **species** of mosquito. (These became celebrated as the "Walter Reed Boards"). On his recommendation the **first** tropical disease board was also established in Manila (January 1900) where it continued for about the next two years. In 1901, Sternberg oversaw the establishment of the U.S. Army **Nurse** Corps. ... / Jesse William Lazear .. attended Trinity Hall Military Academy .. Phi Kappa Psi Fraternity. .. for the United States Army. .. / /// **Sir Otto John Beit**, 1st Baronet, KCMG, FRS (**7 Dec** 1865 – **7 Dec** 1930) was a German-born British **financier** ... Beit was born in Hamburg, Germany, the younger brother of **Alfred Beit**, into the Jewish family of an affluent Hamburg trader. He went to England in 1888, where he joined the stockbroking firm of Wernher, Beit & Co., in which his

brother Alfred Beit, was a partner. In 1890 he left for **South Africa** to gain experience in the diamond industry. He remained for six years and played an active role in the development of Rand Gold Mines and became a member of Hermann Eckstein's firm, H. Eckstein & Co. He fell under the spell of **Cecil Rhodes**'s imperialist vision and was his house-guest. .. he was Director, Rhodesia Railways Ltd; Member, Governing Body of Imperial College, 1912–1930; Trustee of the **Rhodes** Trust, and Beit Railway Trust for Rhodesia; founded Beit Memorial Trust for **Medical** Research; established the Beit Fellowship at Imperial College in memory of his brother Alfred, 1913; founded the Beit Fellowships for Scientific Research at Imperial College. He was also a member of the **Governing** Body from 1912 and a **founder** member of the Royal Institute of International Affairs. ... He administered both the Rhodes Trust and the Beit Trust, through which he became involved in land settlement?? schemes in Southern Africa. He served as director of the British South Africa Company. He was appointed **Knight** Commander of the Order of St Michael and St George (KCMG) in the 1920 New Year Honours for his work in connection with South African troops and hospitals in England and was created a baronet on 25 February 1924 ...was elected Fellow of the Royal Society (FRS) in 1924. On 27 May 1897, he married Lilian **Carter**, the daughter of Thomas Lane Carter of New Orleans, Louisiana, US. ///// **Alfred Beit** (15 Feb 1853 – 16 Jul 1906) major profiteer of infrastructure development

on the African continent. He also donated much money to university education and research in several countries, and was the "**silent** partner" who **structured** the capital flight from post-Boer War South Africa to Rhodesia, **and** the Rhodes Scholarship, named after his **employee**, Cecil Rhodes. ... Alfred Beit, **friend** of Cecil John Rhodes, co-founder of the De Beers Mining Company and co-founder of Southern Rhodesia, was born in Hamburg, Germany. He rapidly became one of a group of financiers who gained control of the diamond-mining claims in the Central, Dutoitspan, and De Beers mines. Rhodes was the active politician and Beit provided a lot of the planning and financial backing. ... In 1886 Beit extended his interests to the newly discovered goldfields of the Witwatersrand and met with great success. In his business ventures there he made use of **financiers** Hermann Eckstein **and** Sir Joseph Robinson. He founded the Robertson Syndicate and the firm of Wernher, Beit & Co. He imported mining engineers from the USA and was among the first to adopt deep-level mining. Rhodes purportedly was granted concessions by Lobengula, as a result of which Beit founded the British South Africa Company in 1888. Beit became **life**-governor of De Beers and also a director of **numerous** other companies such as Rand Mines, Rhodesia Railways and the Beira Railway Company. .. Beit, as one of the trustees, helped control the enormous estate, currently being helped by the **Oppenheimer** family of De Beers and Anglo-American. ..In 1905 he founded a chair of colonial

history at the University of Oxford, which is now the Beit Professor of History of the British Commonwealth. In 1906 he made the donation of **two** million mark to the stock capital of the Hamburgische Wissenschaftliche Stiftung, a charity dedicated to spend its interest for the benefit of a **precursor** of the University of Hamburg. In his will he set up the Beit Trust through which he bequeathed large sums of money (£1,200,000) for infrastructure development in the former Northern and Southern Rhodesia, later **modified to** university education and research in Zimbabwe, Zambia and Malawi. .. Sir Alfred Lane Beit, 2nd Baronet (January 19, 1903 – 12 May 1994) was a British Conservative Party politician .. His **father** Otto Beit (1865–1930) was awarded the KCMG in 1920 and was created a baronet in February 1924. His mother was Lilian, daughter of Thomas Lane Carter of New Orleans, US. ... In 1938 he married Clementine Mabell Kitty **Freeman**-Mitford, born on 22 October 1915, who was the posthumous daughter of Major Clement Mitford (d.1915), a granddaughter of the 1st Lord Redesdale and a cousin of the Mitford **sisters**. Another first cousin Clementine Hozier had married **Winston Churchill**. ... She was occasionally escorted by a handsome young stormtrooper, and was asked by Unity to "waggle a flag" as "the **darling Führer**" passed in the street. .. The Beits continued to visit **Africa** in the 1950s and, they paid for schools, libraries and health clinics??? in Zimbabwe, Malawi and Botswana. .. When his wife Clementine died in 2005,

her will stated that Alfred Beit's diaries should be kept **secret** until 21 years after **Queen** Elizabeth II's death or 70 years after Lady Beit's own death ..

<http://mailstar.net/british-conspiracy.html> ??? ...

<https://www.henrymakow.com/001458.html> ???

<https://www.zambianobserver.com/why-deny-the-obvious-hichilema-is-a-freemason-and-upnd-is-a-masonic-creation/> ???

Cecil Rhodes (1853-1902), South African financier, British statesman and industrialist, who wanted to make Africa a "**British dominion** from the Cape to Cairo"), with the financial support of Nathaniel Meyer **Rothschild** (1840-1915) **and** Alfred Beit, was able to control the diamond mines of South Africa with his Debeers Consolidated Mines Limited, by buying out the French Diamond Co. and then merging with the Barnato Diamond Mining Company. He eventually controlled the production of diamonds throughout the world. ... Rhodes was also **greatly** influenced by Windom Reade's book The Martyrdom of Man, published in 1872, which advocated **Darwinism** and the tremendous **suffering** that man must undergo, which was epitomized in the phrase "the survival of the fittest." The book said that the "inevitable progress of man (was) to perfection." Rhodes incorporated this rationalization into his thinking. //// Hermann Ludwig **Eckstein** (3 August 1847 – 16 January 1893) was a German-born British mining magnate and **banker**. ... joined Julius Wernher **and** Alfred Beit and

in 1884 in the partnership of Jules Porgès & Co (later Wernher, Beit & Co). .. In 1885 Beit arranged for Hermann Eckstein and Jim Taylor, to report on the firm's interests in the Barberton and De Kaap goldfields, in which they had invested heavily. ... In 1888 Eckstein started his own firm under the name of Hermann Eckstein & Co., in the Corner House as a representative of Jules Porgès. He was instrumental in establishing the Chamber of Mines in Johannesburg, and acted as its first president until 1892. The Deed was signed by Julius Wernher, Alfred Beit, Lionel Phillips, Ludwig Breitmeyer, Friedrich Eckstein (his brother), Charles Rube and Ludwig **Wagner**. .. /// Benjamin Robinson, 1st Baronet (3 August 1840 – 30 October 1929) was a South African mining magnate and Randlord. .. // **Alexis Carrel** (1873 –1944) .. He invented the **first** perfusion pump with **Charles A. Lindbergh** opening the way to **organ** transplantation. .. he promoted **eugenics**. .. led to investigations of collaborating with the Nazis, but he **died** before any trial could be held. ... In 1906 he joined the newly formed **Rockefeller** Institute of Medical Research in New York where he spent the rest of his career. .. Carrel **and** Charles Lindbergh became close friends not only because of the years they worked together but also because they shared personal, political, and social views. .. Due to his close proximity with Jacques Doriot's **fascist** Parti Populaire Français (PPF) during the 1930s and his role in implementing **eugenics** policies during Vichy France, he was accused

after the Liberation of collaboration, but died before the trial. .. In 1979, the **lunar** crater?? Carrel was named after him .. In 1902 Alexis Carrel went from being a skeptic of the visions **and** miracles reported at Lourdes to being a believer in spiritual cures after experiencing a healing of Marie Bailly that he could not explain. .. Carrell advocated, in part, that mankind could better itself by following the guidance of an **elite** group of intellectuals, and by incorporating **eugenics** into the social framework. He argued for an **aristocracy** springing from individuals of potential ...Carrel advocated the use of **gasses** to rid humanity of "defectives", thus **endorsing** the scientific racism discourse. His endorsement of this idea began in the mid-1930s, **prior** to the Nazi implementation of such practices in Germany. In the 1936 German introduction of his book, at the publisher's request, he added the following **praise** of the Nazi regime which did **not** appear in the editions in other languages: the German government has taken energetic measures against the propagation of the defective, the mentally diseased, and the criminal. The ideal solution would be the suppression of each of these individuals as soon as he has proven himself to be dangerous. For the insane and the criminal, he endorsed the use of gassing for euthanasia ... ((**Alfred Sauvy**, who **coined** the expression "Third World". ... /// Chales **Lindeberg** --- He completed his degrees in Keystone Lodge Number 243, A. F. & A. M. of Missouri, in December of 1926 // Charles Lindbergh may have been known as a

legendary pilot, but he had another, more sinister position in American History: as a Nazi sympathizer **and** spokesperson for the America First Committee.
https://www.smithsonianmag.com/videos/category/history/charles-lindbergh-and-the-rise-of-1940s-nazi_1/
<https://nationalinterest.org/blog/the-buzz/hitlers-private-army-was-more-terrifying-you-can-possibly-24818> ////

Dr Dame **Honor** Bridget **Fell**, **DBE**, PhD, DSc, FRS (22 May 1900 – 22 April 1986) ... // // The Medical Research Council (MRC) .. Important work carried out under MRC auspices has included: .. the discovery of the structure of DNA by James D. Watson, Francis Crick, Rosalind Franklin and Professor Maurice Wilkins. .. MRC CEOs are normally **automatically knighted**. Chairmen include -- 1916–1920: Major The Hon. **Waldorf Astor** , 1924–1929: The Rt Hon. the Earl of **Balfour Arthur** , Victor Alexander John Hope, 2nd Marquess of **Linlithgow**, KG, KT, FRSE, GCSI, GCIE, OBE (24 Sept 1887 – 5 Jan 1952) //// // Sir William Lawrence **Bragg**, CH, OBE, MC, FRS (1890 –1971) was an Australian-born British physicist and X-ray crystallographer, **discoverer** (1912) of Bragg's law of X-ray diffraction, which is basic for the determination of crystal structure. .. Bragg was **knighted** in 1941. ... Bragg was the director of the Cavendish Laboratory, Cambridge, when the discovery of the structure of DNA was reported by James D. Watson and Francis Crick in February 1953. .. In this work he was aided by Charles **Galton** Darwin, William

Sansome Tucker, Harold Roper Robinson and Henry Harold Hemming. ... he was awarded the Military Cross and appointed Officer of the Order of the British **Empire**. Ernest **Rutherford**, a long-time family friend ... He and RW James measured the absolute energy??? of reflected X-rays, which validated a formula derived by CG Darwin before the war. ... grant from the Rockefeller Foundation. .. After the war he led in the formation of the International Union of Crystallography and was elected its **first** president. ... Among them was **Rosalind** Franklin, whose "photograph 51" showed that DNA was a double helix, **not** the triple helix that the 33 degree freemason **Linus Pauling** had proposed. .. **Bragg** was elected a Fellow of the Royal Society (FRS) in 1921—"a qualification that makes other ones irrelevant". He was **knighted** by King George VI in the 1941 New Year Honours .. // Max Ferdinand **Perutz** OM CH CBE FRS (1914 –2002) ... Perutz's new unit attracted researchers who realised that the field of molecular biology had great promise, among them were Francis Crick in 1949 and James D. Watson in 1951. **Commander** of the Order of the British Empire CBE in 1963 ... **Companion** of Honour in 1975 .. **Order** of Merit OM in 1988. .. ////

Rosalind Elsie Franklin (25 July 1920 – 16 April 1958) was an English chemist and X-ray crystallographer .. Born to a prominent British Jewish family .. Notting Hill, London, into an affluent and

influential British Jewish family. Her father was Ellis Arthur **Franklin** (1894–1964), a politically liberal London merchant **banker** .. Her father's uncle was Herbert Samuel (later Viscount Samuel), who was the Home Secretary in 1916 and the first practising Jew to serve in the British Cabinet.

He was a great grand nephew of **Sir Moses Montefiore** and a great grandson of Mayer Amschel **Rothschild**.
 -- in -- The Jewish Traveler: Hadassah Magazine's Guide to the World's Jewish Communities and Sights [Alan M. Tigay] page 386 --

((Sir Moses Haim **Montefiore**, 1st Baronet, FRS (24 October 1784 – 28 July 1885) was a **British financier** and **banker**, activist, philanthropist and Sheriff of London. Born to an Italian-Jewish family, he donated large sums of money to promote industry, business, economic development, education and health among the Jewish community in the Levant, including the founding of Mishkenot Sha'ananim in 1860, the first settlement of the New Yishuv. As President of the Board of Deputies of British Jews, his correspondence with the British consul in Damascus Charles Henry Churchill in 1841–42 is seen as pivotal to the development of Proto-**Zionism**. In 1812, Montefiore became a **freemason**, joining the Moira Lodge, No. 92 of the Premier Grand Lodge of England in London. In 1812, Moses Montefiore married Judith Cohen (1784–1862), daughter of Levy Barent Cohen. Her sister, Henriette (or Hannah) (1783–1850), married Nathan

Mayer **Rothschild** (1777–1836), for whom Montefiore's firm acted as stockbrokers. Nathan Rothschild headed the family's banking business in Britain, and the two brothers-in-law became business partners. He was also **knighthed** by Queen Victoria and received a baronetcy in 1846 . Sir Moses Montefiore Bart. was the **most** famous English Jew of his time, probably of **all** time.))

Herbert Louis Samuel, 1st Viscount Samuel, GCB, OM, GBE, PC (6 November 1870 – 5 February 1963) was a British Liberal politician who was the party leader from 1931 to 1935. He was the first nominally-practising Jew to serve as a Cabinet minister and to become the leader of a major British political party. ..the **brother** of Sir Stuart Samuel. He was educated at University College School in Hampstead, London and Balliol College, Oxford. .. Samuel worked through the influence of Charles **Darwin** . He put forward the idea of establishing a British protectorate over **Palestine** in 1915, and his ideas influenced the **Balfour** Declaration. .. One month after Britain's declaration of war on the Ottoman Empire in November 1914, Samuel met Chaim Weizmann, who was to become the President of the World Zionist Organization and later the **first** President of Israel. According to Weizmann's memoirs, Samuel was already an avid believer in Zionism and believed that Weizmann's demands were too modest. .. the solution of the problem of Palestine which would be much the most welcome to the leaders

and supporters of the Zionist movement throughout the world would be the **annexation** of the country to the British **Empire**". ... Samuel was the first Jew to govern the historic land of Israel in 2000 years. ... He was appointed Knight Grand Cross of the Order of the British Empire (GBE) on 11 June 1920. .. On 17 November 1897 Samuel married his first cousin Beatrice Miriam (1871–1959), daughter of Ellis Abraham Franklin, a **banker**. .. the son of a **rich** banker who was able to retire in his forties but died when Samuel was just six years old. ... Balliol College, Oxford ... Viscount Samuel, of Mount Carmel and Toxteth in the City of Liverpool, is a title in the Peerage of the United Kingdom. It was created in 1937 for the Liberal politician and former High Commissioner of the British Mandate of Palestine, Herbert Samuel. ... The first Viscount Samuel was the nephew of the **banker** Samuel **Montagu**, 1st Baron Swaythling. .= Samuel Montagu, 1st Baron Swaythling was a British **banker** who founded the bank of Samuel Montagu & Co. (Sir Stuart Montagu Samuel, 1st Baronet (24 October 1856 – 13 May 1926) was a British **banker** and Liberal politician who was Member of Parliament for Whitechapel. ..In 1912 he was created Sir Stuart Samuel, Baronet of Chelwood Vetchery. ...) Her aunt, Helen Caroline Franklin, known in the family as Mamie, was married to Norman de Mattos Bentwich, who was the Attorney General in the **British** Mandate of **Palestine**. Helen Caroline Franklin was active in trade union organisation and the women's suffrage

movement, .. Crick's thesis advisor, Max Perutz, ... Franklin was best described as an agnostic. ... She confided to her sister that she was "always consciously a Jew". ... She initially blamed Winston Churchill for inciting the war, **but** later admired him for his speeches. Her sister Jenifer Glynn claimed that these stories are **myths**, and that her parents fully supported Franklin's entire career. ... Her **father** Ellis Franklin was a partner at Keyser's **Bank**, one of the family's major businesses (publisher **Routledge** & Kegan Paul was another). .. Some émigré faculty (e.g. biochemist Max Perutz) were detained as aliens. In one letter Franklin noted, "Practically the whole of the Cavendish [Laboratory] have disappeared. Biochemistry was almost entirely run by Germans and may not survive." Cambridge also took in a number of war refugees, including the French scientist **Adrienne Weill**, who arrived at Newnham in 1940, and became Franklin's mentor and friend. ... Her friend Charles Coulson, a **theoretical** chemist, suggested she look into doing x-ray diffraction studies of large biological molecules. In 1950 she was awarded a three-year Turner and Newall Fellowship to work in John T. Randall's Biophysics Unit at King's College London. ... Her **mathematical** analyses of the dry form diffractions, however, did not indicate a helical structure, and she spent over a year trying to resolve the differences. By early 1953 she had concluded that both forms had two helices. Meanwhile, at the Cavendish Laboratory at Cambridge, Francis Crick and James Watson were working on a **theoretical** model of DNA.

Though not in close communication with Franklin, in January 1953 they gleaned crucial insights about DNA's structure from one of her x-ray diffraction photos shown to them by Wilkins, and from a summary of her unpublished research submitted to the Medical Research Council. She became a research associate at King's College London in 1951 and worked on X-ray diffraction studies, which would eventually facilitate the double helix **theory** of the DNA. ... After finishing her work on DNA, **Franklin** led pioneering work at Birkbeck on the molecular structures of **viruses**. Franklin died of ovarian cancer in 1958, at age 37. .. In January 1951, Franklin began working as a research associate at the King's College London in the biophysics unit, where director John Randall used her expertise and X-ray diffraction techniques (mostly of proteins and lipids in solution) on DNA fibers. Studying DNA structure with X-ray diffraction, Franklin = AGE ?? and her student Raymond Gosling AGE ?? made an amazing discovery: They took **pictures** ??? of DNA and discovered that there were two forms of it, a dry "A" form and a wet "B" form. One of their X-ray diffraction pictures of the "B" form of DNA, known as Photograph 51, became famous as critical evidence in identifying the structure of DNA. The photo was acquired through 100 hours of X-ray exposure from a machine Franklin herself had refined... **John Desmond Bernal**, one of the United Kingdom's most well-known and **controversial** scientists and a pioneer in X-ray crystallography, spoke highly of Franklin around the

time of her death in 1958 **In five years, Franklin published 17 papers on viruses**, and her group laid the **foundations** for structural virology. The race to uncover the structure of DNA reveals fascinating insights into how Franklin's data was key to the double helix model, but the '**stealing**' **myth** stems from Watson's memoir and attitude rather than facts ... In April 1953, the scientific journal *Nature* published three back-to-back articles on the structure of DNA, the material our genes are made of. Together, they constituted one of the **most important** ??? scientific discoveries in history. The first, **purely theoretical**, article was written by Watson and Crick from the University of Cambridge. Immediately following this article were two data-rich??? papers by researchers from King's College London: one by Maurice Wilkins and two colleagues, the other by Franklin and a PhD student, Ray Gosling. ... The model the Cambridge duo put forward did not simply describe the DNA molecule?? as a double helix. It was extremely precise, based on complex measurements of the angles formed by different chemical bonds, underpinned by some extremely powerful mathematics and based on **interpretations** that Crick had recently developed as part of his PhD thesis. The historical whodunnit, and the claims of data theft, turn on the origin of those measurements. .. Franklin, an expert in X-ray crystallography, had been recruited to King's in late 1950. ... Her friend Norma Sutherland recalled: "Her manner was brusque and at times confrontational – she

aroused quite a lot of hostility among the people she talked to, and she seemed quite insensitive to this.” ... Watson recalled that when he saw the photo – which was far clearer than any other he had seen – ‘my mouth fell open and my pulse began to race.’ According to Watson, photo 51 provided the vital clue to the double helix. But despite the excitement that Watson felt, all the main issues, such as the number of strands and above all the precise chemical organisation of the molecule, remained a mystery. A glance at photo 51 could not shed any light on those details. What Watson and Crick needed was far more than the idea of a helix – they needed precise observations from X-ray crystallography. Those numbers were unwittingly provided by Franklin herself, included in a brief informal report that was given to Max Perutz of Cambridge University.

In February 1953, Perutz passed the report to Bragg, and thence to Watson and Crick.

Crick now had the material he needed to do his calculations. Those numbers, which included the relative distances of the repetitive elements in the DNA molecule, and the dimensions of what is called the monoclinic unit cell – which indicated that the molecule was in two matching parts, **running in opposite directions** – were decisive.

The report was not confidential, and there is no question that the Cambridge duo acquired the data dishonestly.

However, they did not tell anyone at King's what they were doing, and they did not ask Franklin for permission to **interpret** her data (something she was particularly prickly about).

Their behaviour was cavalier, to say the least, but there is no evidence that it was driven by sexist disdain: Perutz, Bragg, Watson and Crick would have undoubtedly behaved the same way had the data been produced by Maurice Wilkins.

Ironically, the data provided by Franklin to the MRC were virtually identical to those she presented at a small seminar in King's in autumn 1951, when Jim Watson was in the audience. Had Watson bothered to take notes during her talk, instead of idly musing about her dress sense and her looks, he would have provided Crick with the vital numerical evidence 15 months before the breakthrough finally came.

By chance, Franklin's data chimed completely with what Crick had been working on for months: the type of monoclinic unit cell found in DNA was also present in the horse haemoglobin he had been studying for his PhD. This meant that DNA was in two parts or chains, each matching the other. Crick's expertise explains why he quickly realised the significance of these facts, whereas it took Franklin months to get to the same point.

While Watson and Crick were working feverishly in Cambridge, fearful that Pauling might scoop them, Franklin was finishing up her work on DNA before leaving the lab. The progress she made on her own, increasingly isolated and without the benefit of anyone to exchange ideas with, was simply remarkable.

Franklin's laboratory notebooks reveal that she initially found it difficult to **interpret** the outcome of the **complex mathematics** – like Crick, she was working with nothing more than a slide rule and a pencil – but by 24 February, she had realised that DNA had a double helix structure and that the way the component nucleotides or bases on each strand were connected meant that the two strands were complementary, enabling the molecule to replicate.

Above all, Franklin noted that ‘an infinite variety of nucleotide sequences would be possible to explain the biological specificity of DNA’, thereby showing that she had glimpsed the most decisive secret of DNA: the sequence of bases contains the genetic code.

To prove her point, she would have to convert this insight into a precise, **mathematically** and chemically rigorous model. She did not get the chance to do this, because Watson and Crick had already crossed the finishing line – the Cambridge duo had rapidly interpreted the double helix structure in terms of precise spatial relationships and chemical bonds, through the construction of a physical model.

In the middle of March 1953, Wilkins and Franklin were invited to Cambridge to see the model, and they immediately agreed it must be right. It was agreed that the model would be published solely as the work of Watson and Crick, while the supporting data would be published by Wilkins and Franklin – separately, of course. On 25 April there was a party at King's to celebrate the publication of the three articles in *Nature*. Franklin did not attend. She was now at Birkbeck and had stopped working on DNA.

Franklin died of ovarian cancer in 1958, four years before the Nobel prize was awarded to Watson, Crick and Wilkins for their work on DNA structure. She never learned the full extent to which Watson and Crick had relied on her data to make their model; if she suspected, she did not express any bitterness or frustration, and in subsequent years she became very friendly with Crick and his wife, Odile.

Our picture of how the structure of DNA was discovered, and the **myth** about Watson and Crick stealing Franklin's data, is almost entirely framed by Jim Watson's powerful and influential memoir, *The Double Helix*. Watson included frank descriptions of his own appalling attitude towards Franklin, whom he tended to dismiss, even down to calling her 'Rosy' in the pages of his book – a nickname she never used (her name was pronounced 'Ros-lind'). The epilogue to the book, which is often overlooked in criticism of Watson's attitude to Franklin, contains a generous and

fair description by Watson of Franklin's vital contribution and a recognition of his own failures with respect to her – including using her proper name.

It is clear that, had Franklin lived, the Nobel prize committee ought to have awarded her a Nobel prize, too – her conceptual understanding of the structure of the DNA molecule and its significance was on a par with that of Watson and Crick, while her crystallographic data were as good as, if not better, than those of Wilkins. The simple expedient would have been to award Watson and Crick the prize for Physiology or Medicine, while Franklin and Watkins received the prize for Chemistry.

Rosalind Elsie Franklin was born in London, England. Her family was well-to-do and both sides were very involved in social and public works. Franklin's father wanted to be a scientist, but World War I cut short his education and he became a college teacher instead. In 1953, both Wilkins and Franklin published papers on their X-ray data in the **same** Nature issue with Watson and Crick's paper on the structure of DNA. ..

===== DNA was first crystallized in the late 70's — remember, the 1953 X-ray data were from DNA fibers. So, the real "proof" for the Watson-Crick model of DNA came in 1982 after the B-form of DNA was crystallized and the X-ray pattern was solved. ... If the DNA of one human cell is stretched out, it would be almost 6 feet long and contain over three billion base

pairs. How does all this fit into the nucleus of one cell?

www.dnafb.org/19/bio-3.html

Franklin was born in London on 25 July 1920 to Muriel Waley Franklin and Ellis Franklin. Rosalind's father followed the family tradition into a banking career, and both of her parents were involved in philanthropic and public service activities. In X-ray crystallography, crystallographers shoot X-rays at crystalline structures. The **atoms** within the crystal diffract some of the X-rays in specific patterns, which the crystallographers capture on film. By measuring the angles and intensities of the patterns, the researchers are able to create a three-dimensional picture of the crystalline structure. Franklin mastered the technique by studying the crystalline structure of coal. Franklin developed a method of arranging the chromosomes to produce clearer pictures. To distinguish between two structures of DNA, named structure A and structure B, Franklin used variations in humidity by manipulating **salt** solutions. Franklin found that structure A appeared at low humidity and had a lined, crystalline appearance. Structure B appeared at higher humidity and had a distinct cross pattern, indicative of a helical shape. Franklin initially thought DNA was shaped as a helix, as seen in structure B, but she had difficulty reconciling that with the fibrous appearance of structure A. Franklin wanted proof for her helical theory, but the more Franklin studied structure A, the **less** convinced she was that structure A was helical like structure B. This interpretation led Franklin away from the double helical structure of DNA

later described by James Watson and Francis Crick at Cambridge University. When Watson and Crick submitted their findings for publication on 6 March 1953, Franklin was close to discovering the structure of DNA, and she used her work to support the Watson-Crick model. Wilkins published a separate article that further supported Watson and Crick's model. **All three** articles were published together in *Nature* on 25 April 1953. A sentence at the end of the Watson and Crick article states that they were influenced by Wilkins and Franklin's work. Franklin's *Nature* article discusses how her work aligned with Watson and Crick's conclusions. Franklin mentions the **reversibility** between structure A and structure B with the change in humidity. Franklin also states that higher humidity allows the molecules to assume their lowest energy conformation, making it probable that structure B is the natural form of DNA. Franklin describes a **formula** used to decipher the data in the X-ray crystallography photographs and how that **formula** indicates that two phosphate backbones occupy the outer edges of the helical structure. Franklin asserts that, based upon her research about chemical properties, the phosphate groups are on the outside and the bases are on the inside of the helical structure. Franklin does **not** fully endorse the Watson and Crick model, but instead says the data does **not** disprove their model. her **aunt**, Helen Caroline Franklin was a trade unionist and suffragist married to **Norman** de Mattos Bentwich, Attorney General of the British Mandate of Palestine.

Franklin's mother was Muriel Frances Waley, the daughter of an unsuccessful barrister, Arthur Waley. ... Rosalind's father was Ellis Arthur Franklin. Originally he had intended to study physics at Oxford University, but this was thwarted when he was called up to join the army on the outbreak of the First World War, and then marriage which led him to accept work in the family-based merchant bank, A **Keyser** & Co. When war broke out, however, attempted, without success, to persuade her to abandon her studies to do war work. Rosalind took the view that she would be of more use to the **war effort** if she completed her chemistry degree. She was backed up on this point by both her mother and her aunt Alice, her father's eldest sister.

Franklin was born on 25 July 1920 in 50 Chepstow Villas, Notting Hill, London, into an affluent and influential British Jewish family. Her father was Ellis Arthur Franklin (1894–1964), a politically liberal London merchant banker who taught at the city's Working Men's College, and her mother was Muriel Frances Waley (1894–1976). In her last year at Cambridge, she met a French refugee Adrienne Weill, a former student of Marie Curie, who had a huge influence on her life and career .. An operation on 4 September of the same year revealed two tumours in her abdomen. After this period and other periods of hospitalization, Franklin spent time convalescing with various friends **and** family members. These included Anne Sayre, Francis Crick, his wife Odile, with whom Franklin had formed a strong friendship ... She also

specified the **amount of water to be found in the molecule** in accordance with other parts of it, data that have considerable importance in terms of the stability of the molecule. Franklin was the first to discover and formulate these facts, which in fact constituted the basis for all later attempts to build a model of the molecule. However, Watson, at the time ignorant of the chemistry, failed to comprehend the crucial information, and this led to construction of a wrong model. ,... Ellis Arthur Franklin **OBE** The Most Excellent Order of the British Empire .. It was established on 4 June 1917 by King George V (1894–1964) was an English merchant **banker**. ... the son of Arthur Ellis Franklin, a merchant banker and senior partner of Keyser & Co, and his wife Caroline Jacob. ... He was a banker at Keyser & Co, where his father was senior partner ... A. Keyser & Co was an independent merchant bank **founded** by Samuel **Montagu** and his partners in 1868. Naomi Levine states that Keyser was founded by Ellis Abraham Franklin using Montagu's money.[2] In The Rise of Merchant Banking, Stanley D. Chapman describes Keyser & Co as a "second eleven" for the overcrowded flanks of Montagus and Franklins.[3] Sir Edward du Cann, a Member of Parliament (MP) and former chairman of the Conservative Party, was chairman of Keyser Ullman from 1970 to 1975. In October 1974, du Cann and the executive of the 1922 Committee met at du Cann's **Keyser** Ullman offices in Milk Street, where it was decided that the Committee would press Edward Heath to hold a leadership election, which led to

Margaret **Thatcher** becoming party leader. The press called them the "Milk Street **Mafia**". A Department of Trade and Industry report into the failure of Keyser Ullman found du Cann to have been "incompetent" while chairman between 1970 and 1975. "In 1973, the bank lent pounds 17m to a 28-year- old entrepreneur, Christopher Selmes, secured on a valueless guarantee. Mr Selmes later fled the country, leaving debts of more than pounds 20m."[4] Property developer Jack Dellal sold his merchant bank, Dalton Barton to Keyser Ullman for £58m just before the 1973-74 banking crisis that caused Keyser's failure. Dellal was deputy chairman of Keyser and some have argued that he was "prime culprit" in the failure of Keyser Ullman and du Cann's resulting bankruptcy.[5] Arthur Ellis Franklin (18 April 1857 – 24 December 1938) was a British merchant banker and senior partner of Keyser & Co. ... He was the son of the merchant banker Ellis Abraham Franklin (1822-1901), and came from a prominent Anglo-Jewish family, originally Fraenkel, that arrived in England in the 18th century. Franklin was senior partner of A. Keyser & Co.[.. His wife was Caroline Jacob.[1] They had six children: Jacob Franklin; Alice Franklin, manager of the Townswomen's Guild; Cecil Arthur Franklin, chairman of the publishers Routledge; Hugh Franklin, a campaigner for women's suffrage and later Labour politician; Helen Caroline Franklin (later Bentwich) CBE, a social worker and politician; and Ellis Arthur Franklin, also a merchant banker. UNMARRIED

.... HOW EVENTS UNFOLDED IN THE DISCOVERY OF DNA'S STRUCTURE IS STILL DEBATED TODAY. ... Many books have been written hashing over events, either criticizing Watson and Crick, saying they stole Franklin's research, or defending the duo, saying her research helped them but that Franklin would not ultimately have reached their conclusions on her own. Though Franklin and Watson never became friendly, Crick and his wife welcomed Franklin into their home while she was being treated for ovarian cancer. Norman De Mattos Bentwich OBE MC (28 February 1883 – 8 April 1971) was a British barrister and legal academic. He was the British-appointed attorney-general of Mandatory Palestine and a lifelong Zionist..... Norman Bentwich was the oldest son of British **Zionist** Herbert Bentwich. ... Bentwich was a delegate at the annual Zionist Congresses from 1907 to 1912. He paid his first visit to Palestine in 1908. .. /// **Maurice** Hugh Frederick **Wilkins** CBE FRS (15 Dec 1916 – 5 Oct 2004) was a New Zealand-born British physicist and molecular biologist Watson to write "Wilkins... has obtained extremely excellent X-ray diffraction photographs" [of DNA]. .. /// William Gemmell **Cochran** (15 July 1909 – 29 March 1980) was a prominent **statistician**./// **Phoebus** Aaron Theodore **Levene** (25 February 1869 – 6 September 1940) .. He was born into a Litvak (Lithuanian Jewish) family as Fishel Rostropovich

Levin .. he studied medicine at the Imperial **Military** Medical Academy (M.D., 1891) .. Levene enrolled at **Columbia** University .. In 1905, Levene was appointed as **head** of the biochemical laboratory at the **Rockefeller** Institute of Medical Research. He spent the rest of his career at this institute, and it was there that he identified the components of DNA.

“The Structure of DNA” . In the fall of 1951, Crick was diverted somewhat from his protein research by the arrival of a young American, James D. Watson. Now Crick had found a collaborator, who like him recognized DNA as the **chief** if **not** the **sole** hereditary material, and after two attempts at building a model by the stochastic method, they arrived at the essentially **correct** structure in the spring of 1953. Their first attempt in 1951 had proved a fiasco and had caused the ire of Professor Bragg. Not until **Pauling** was about to publish his own structure for DNA had Bragg in February 1953 permitted Watson and Crick to make a second attempt. Now they **opted** for a two-chain cylindrical molecule, the helical chains on the outside of the cylinder held together by **hydrogen** bonds between the bases on the inside. This pairing of bases was specific, always adenine paired with thymine and guanine with cytosine, thus accounting for the strange 1:1 ratios between these pairs of bases described by the biochemist **Erwin Chargaff**.

(no one has seen any hydrogen atom or any atom).

Erwin Chargaff, one of the **most** prominent biochemists of our time, speaks of the ‘**metaphysical** nausea’ that gripped him, the existential terror that struck him when hearing about the detonation of “atom” bombs over Hiroshima and Nagasaki. <https://www.ts-adyar.org/sites/default/files/pdf/Theosophist/Volumes/VOL%20131%20NO.%202%20NOV%202009.pdf>

Chargaff discovered two rules that **helped** lead to the discovery of the double helix structure of DNA. **Yale** University (1925–1930), University of **Berlin** (1930–1933), Pasteur Institute (1933–1934), Columbia University (1935–1974) .. Doctoral advisor Fritz Feigl .

Erwin Chargaff

was born into a **wealthy** family on August 11, 1905, in the city of Czernowitz, one of the provincial capitals of Austria-Hungary. The city is now in Ukraine. Erwin’s **father** was Hermann Chargaff, who owned a small, private **bank**. His **mother** was Rosa Silberstein. Both of his parents were well-educated, German-speaking, Austrian **Jews**. (My father, Hermann Chargaff (1870-1934), had inherited modest ? wealth and a small private bank from his father.) When Erwin was **five**, his father’s bank ran into financial difficulties. He was educated at one of Vienna’s **best** schools – the Maximiliansgymnasium .Erwin joined the **Boy Scouts** .“My real reading began, I believe, in 1920,

when my mother gave me as a present **Goethe's** complete works in the sixteen volumes of the beautiful Insel edition. They still stand, much read on my shelves.” ERWIN CHARGAFF Heraclitean Fire, 1975 ..

After spending a few uncomfortable days on Ellis Island, Chargaff was **rescued** by Treat Johnson, Professor of Chemistry at **Yale** University.

Between 1928 and 1930, Chargaff worked successfully with **Yale's** Rudolph Anderson, publishing seven papers, discovering two branched-chain fatty acids, and studying the **tuberculosis** bacterium.

Chargaff spent two and a half years in **Berlin**, carrying out independent research at the University of Berlin's Institute of **Hygiene** (read **eugenics**).

In March 1933, age 28 ??? he received a letter inviting him to work at the **Pasteur** Institute in Paris.

In 1935, Chargaff began working as a biochemist at New York's Columbia University..

In 1944, Chargaff became aware of research carried out by **Oswald Avery** and his colleagues at New York's **Rockefeller** Institute. The **Avery–MacLeod–McCarty** experiment **suggested??** that genes – the heredity code passed from parents to offspring – were made **of** DNA. ((**Oswald Theodore Avery Jr.** (Oct 21, 1877 – Feb 20, 1955) The **major** part of his career was spent at the **Rockefeller** University Hospital in New York City. .

Copley Medal (1945) **Albert Lasker** Award for Basic Medical Research (1947) ..The lunar crater Avery was named in his honor. .. **Colin Munro MacLeod** (Jan 28, 1909 – Feb 11, 1972) consultant to the U.S. Secretary of **War**. He became an official member of the **Army** Epidemiological Board, which in 1949 was enlarged to include all the armed forces and renamed the Armed Forces Epidemiological Board. MacLeod became president of the board in 1947, a position he held until 1955. .. **Maclyn McCarty** (Jun 9, 1911 – Jan 2, 2005) .. best known for his part in the discovery that DNA, rather than protein, constituted the **chemical** nature of a gene. .. He served for 14 years as the physician-in-chief of the **Rockefeller** University Hospital, and as a trusted adviser and the vice president of the **Rockefeller** University. .. Outside the university, his leadership was sought by the New York City Health Research Council, the Helen Hay **Whitney** Foundation, the Institute of Medicine (as a charter member), **and** numerous university visiting boards. /// **William Payne Whitney Skull and Bones** & Delta Kappa Epsilon was born on March 20, 1876 to William Collins Whitney **Skull and Bones** (1841–1904) In addition to a substantial inheritance from his father, Payne Whitney inherited \$63,000,000 from his **uncle, Col.** Oliver Hazard Payne. Amongst his many investments, Whitney had major holdings in banking, tobacco, railroads, mining and oil. He was a member of the board of directors and/or an executive officer of **several large** corporations, including the City Bank New York, and the Great

Northern Paper Company, and the Northern Finance Corporation.))

((We have created a mechanism that makes it practically impossible for a **real** genius to appear. In my own field the biochemist Fritz Lipmann or the much-maligned Linus Pauling were very talented people. But generally, geniuses everywhere seem to have died out by 1914. Today, most are mediocrities blown up by the winds of the time.” -Erwin Chargaff, 1985. ... In his truly remarkable autobiography *Heraclitean Fire: Sketches from a Life before Nature*, Chargaff calls Watson and Crick “a variety act” and further describes them as: One 35 years old (Crick), with the looks of a fading racing tout. . .an incessant falsetto, with occasional nuggets gleaming in the turbid stream of prattle. The other (Watson), quite undeveloped. . .a grin, more sly than sheepish. . .a gawky young figure. He further notes that: I **never** met two men who knew **so little and** aspired to so much. They told me they wanted to construct a helix, a polynucleotide to rival Pauling’s helix. They talked so much about ‘pitch’ that I remember I wrote it down afterwards, ‘Two pitchmen in search of a helix.’))

Although Avery’s work was greeted by most scientists with **skepticism**, Chargaff was one of the very few to immediately embrace it. He decided to wrap up everything he had been working on and switch his lab’s focus to DNA.

Chargaff had also been influenced by the great **quantum** physicist Erwin Schrödinger's **1944** book *What is Life?* **gene was a hereditary code-script.**

Chargaff was **not the only** scientist captivated by *What is Life?* Other **devotees** included James Watson and Francis Crick. In 1944, Watson was **16** years old and studying biology at the University of Chicago; Crick was 28 years old and carrying out research for the British Royal Navy after abandoning his physics Ph.D. at the outbreak of World War 2.

Chargaff **believed** Avery's experiment indicated that living species differed because of differences in their DNA. Now he sought evidence in support of this belief.

Working with a number of colleagues, including Ernst Vischer **and** Charlotte Green, Chargaff began getting interesting results in 1947. Chargaff prepared the DNA, while Vischer and Green used partition chromatography to separate it into its components for analysis by ultraviolet spectrophotometry. Although their early results were rather rough, Chargaff was reassured: they **seemed** to suggest there were real differences in DNA taken from different species.

At this stage Chargaff **pictured** a DNA molecule as a Moebius strip which could **split** along its center line with each of the two halves inheriting the twisting topology of the parent strip.

In the 1880s and 1890s Albrecht Kossel at the University of **Berlin** had shown that DNA contains

four bases (in the acid-base sense): adenine, cytosine, guanine, and thymine – generally abbreviated A, C, G, and T.

In the late 1920s, **Phoebus Levene** in New York had shown that DNA consists of a very long chain made of repeating chemical units of the form phosphate-sugar-base.

He called these repeating units nucleotides.

Each molecule of DNA is made up of a huge number of these nucleotides strung together like segments of a necklace.

In 1949, Chargaff discovered that the **proportions** of bases in DNA depend on the species the DNA comes from. This was a major break from what scientists had believed until then.

Phoebus Levene, the most respected worker in the field, had **wrongly** insisted that the proportions of DNA's bases did not vary from species to species. This meant, he said, that DNA did **not** have the variation needed to be genetic material.

Chargaff said the number of possible arrangements of bases was truly enormous and therefore DNA could very well be the **agent** of inheritance.

Chargaff discovered that in DNA from any source the amount of T was equal to A. Also, the amount of C was equal to G.

Although he may have thought these ratios hinted that T was always physically paired or connected to A, and C to G, he did **not** suggest it.

These discoveries came to be known as Chargaff's Rules:

- in any species the ratio of A:T is 1:1 and G:C is 1:1
- other ratios such as A:G, for example, vary from species to species

“When I began to realize how unique were the regularities we had discovered, I tried, of course, to understand what it all meant, but did not get very far. I attempted to build molecular models of the nucleotides... [but] I ran out of **atoms** and even more of patience... Thus I missed the opportunity of being enshrined in the various halls of **fame** of the science museums.”

ERWIN CHARGAFF Heraclitean Fire, 1975

Chargaff met Watson and Crick “informally” in Cambridge, UK, in May 1952.

Chargaff chatted??? to them about his work, including the 1:1 ratios.

Less than a year after meeting Chargaff, Watson and Crick had cracked DNA's double helix code.

“They had enormous ambition and aggressiveness, coupled with an almost complete ignorance of, and a

contempt for, chemistry... a contempt that was later to have a nefarious influence on the development of 'molecular biology.'"

ERWIN CHARGAFF Heraclitean Fire, 1975

Chargaff began to despise the whole field of molecular biology, declaring that nature would never be understood by merely studying molecules. He waged a relentless war against molecular biology for the rest of his life.

((no one has seen any molecules))

In October 1957, acting as a referee for the *Journal of Biological Chemistry*, he **rejected** two papers from microbiologist Arthur Kornberg.

Soon these very papers would win Kornberg the Nobel Prize in Medicine. They described how Kornberg and his colleagues had isolated an **enzyme** – DNA polymerase – that added additional nucleotides to DNA in a test-tube, multiplying the amount of DNA by a factor of 10.

His contempt for molecular biology was unremitting. At the age of 92 he wrote:

"Practitioners of this discipline are forced to use many half-understood techniques, yielding many results they are not really competent to evaluate."

ERWIN CHARGAFF In Dispraise of Reductionism, 1997

Chargaff's contributions were widely recognized. He was elected to the National Academy of Sciences in 1965. He received many awards including the Pasteur Medal in 1949, Carl Neuberg Medal in 1958, Charles Leopold Mayer Prize in 1963, Heineken Prize in 1964, Gregor Mendel Medal in 1974, and the National Medal of Science in 1975.

A talented **linguist**, Chargaff never lost his love of classical literature, savoring it more often than not in its original language.

In the course of his career he authored over 500 essays and publications in academic journals.

Chargaff retired from Columbia University in 1974, aged 69; he remained a faculty member until 1982. He then relocated his laboratory to the Roosevelt Hospital and worked there until finally truly retiring from active research in 1992, aged 86.

<https://www.famousscientists.org/erwin-chargaff/>

Aaron Klug, holder of the Order of Merit (a tribute to greatness, in the personal gift of the Queen) and, from 1995 to 2000, President of the Royal Society.

"Dark Majesty: the secret brotherhood and the magic of a thousand points of light" -- Other endorsers of the , Planetary Initiative for the World We Choose , include Glen Olds, a Methodist church official who is pushing a "Mother Earth" theology; **Linus Pauling**, Nobel laureate scientist; Aurelio Peccei, president of the Club of Rome; Rusty Schweickart, former astronaut; Reverend Theodore Hesburgh, president of the University of Notre Dame; Erwin Lazlo, a noted teacher of dialectics and so-called "systems theory;" Saul Mendlovitz, director of the Institute for World Order; Douglas Roche, member of Canada's House of Commons; and Professor George Wald of Harvard University. Also affiliated are author Norman Cousins, who, until he recently passed away, was head of the World Federalists Association; Arnold Fraser, former U.S. congressman and mayor of Minneapolis, Minnesota; George Brown, professor at the University of California; and the Tibetan Buddhist spiritual leader, the Dalai Lama. The involvement of all of these world-acclaimed leaders in a scheme to set up a Council of Wise Persons certainly lends credibility to the warnings and "red alerts" that have been sounded over the years that the leadership of the world revolution was about to come out of the closet. When it does someday publicly and openly assume the reins of world government, what the Secret Brotherhood wants to do is to insist that its leadership role of this globe was invited by the peoples of earth. The Brotherhood wants to maintain the myth that everything it does is simply done in response to the

desire and longing of all of humanity. The Secret Brotherhood wants us to believe that it is a democratic group which will come up with democratic solutions and policies designed through a democratic process. --- Among the endorsers of **Planetary Citizens** from the United States, are these persons: Leonard Bernstein; Kenneth Boulding; Coretta Scott King, widow of the assassinated Reverend Martin Luther King; **Linus Pauling**, Nobel Prize winner in medicine; Victor Reuther, international labor leader; Pete Seeger, musician; Professor George Wald of Harvard; best-selling novelist John Updyke; novelist Kurt Vonnegut; and humanist psychologist Rollo May. // A New Barbarism? Perhaps Irwin Chargaff, has been called the father of **bioengineering**. Surveying the new world that is galloping toward us with a cloud of fire and dust following in its wake, Chargaff says: I see the beginnings of a new barbarism. ..which tomorrow will be **called** a "new culture."... Nazism was a primitive, brutal, and absurd expression of it. But it was a first draft of a so-called **pre- scientific** morality that is being prepared for us in the radiant future. Chargaffs frightening conclusion is that mankind today is teetering on the edge of catastrophe, brought about by determined and calculating men who wish to implant in our minds the seeds of a new reality. These men are builders of the New Culture. But the world they are constructing will push men forward into a dark, black vault of horror. "Before every catastrophe," Chargaff cautions, "as before an earthquake, there are signs of

what is to come." What is so fantastically preposterous about the **illuminized** society that now surrounds us is that it comes **cloaked** with good intentions and altruistic motives. As Chargaff suggests, it comes to us described as a glowing, radiant, and promising new future-and men everywhere are buying into this distorted but seductive picture and image. It is as though mankind has been drugged by powerful hallucinogenic agents, mind control drugs which have induced a severe state of schizophrenia, paranoia, stupor and paralysis. In a manner of speaking, mankind has been given a fatal overdose of mind control drugs and has become the victim of these poisonous "bullets." Moreover, the victim now needs long-term psychiatric care or confinement in a "government asylum." This asylum is the **entire** world! And who are the masters, the **psychiatrists** magicians who run this supervised and meticulously planned government asylum? Naturally, they are the men of the Secret Brotherhood. *Psychic Chemicals Introduced Into Men's Minds* . It is not farfetched to look upon our world and society today as one gigantic, universal nut house. In this global facility for the mentally impaired masses, the hapless and unwitting patients are **daily** fed dangerous thought-control drugs to alter their memory and heighten their susceptibility. These psychic chemical agents leave them dangerously vulnerable to magical suggestive powers. That would **certainly** explain why the masses find such horrors as the sadistic torture and fiendishness now routinely depicted in movies, the killing of

millions of unborn babies, homosexual acts of perversion, and the **creation** of World Government not only palatable, **but** greatly desirable.

https://archive.org/stream/DarkMajesty/Dark%20Majesty%20-%20Texe%20Marrs_djvu.txt

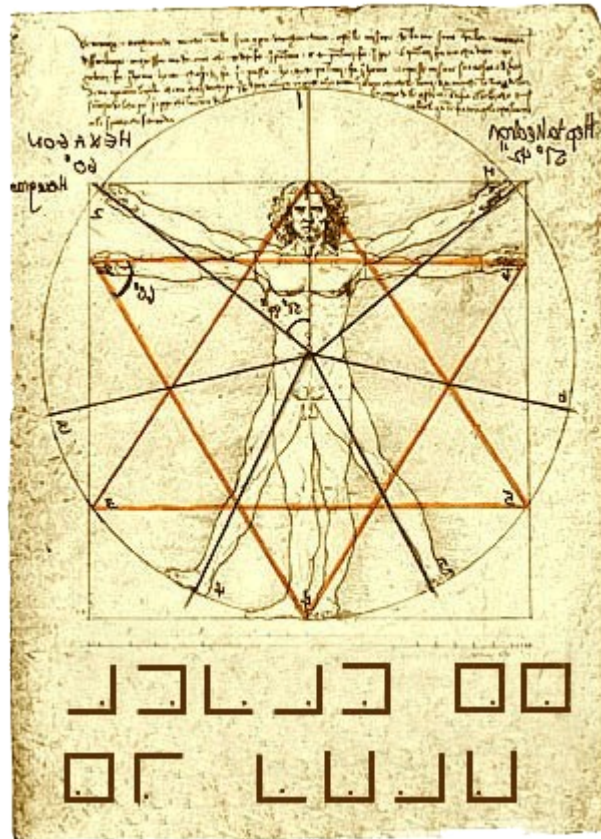
<https://the-eye.eu/public/concen.org/Texe%20Marrs%20-%20Robot%20Alchemy%20%5Bpack%5D/ebooks/PDF/Dark%20Secrets%20of%20the%20New%20Age%20-%20Texe%20Marrs.pdf>

Alchemy - Science and Pseudoscience

<https://www.crystalinks.com/alchemye.html>

<https://sacred-texts.com/dna/index.htm>

The Golden Ratio (PHI) of Humans and DNA by Moe | DNA, Meaning of Symbols, Meaning of Words
 God's fingerprint is often referred to as the "Golden Ratio" (1.618) and is the 21st letter of the Greek.
 God's fingerprint is often referred to as the "Golden Ratio" (1.618) and is the 21st letter of the Greek



alphabet, *PHI* [ϕ] that appears all throughout nature of our world and the universe. It is the universal law of the divine number that ensures harmonious interrelations among all life, and the only number which both ‘adds and multiplies simultaneously.’ The golden ratio or phi is **also** called by **other** names such as the [Fibonacci numbers](#), golden mean, divine mean, golden spiral, divine proportion or golden section.

The golden ratio simply appears to be the main source code that we can apply to all intelligent divine creation and is **also** the number assigned to man. It can be applied to almost all things in our world ranging from the bee honeycomb, nautilus shells, water, roses, sunflowers, snowflakes, music, architecture, art, the planets, galaxy, animals, symbol of Man, the microcosm, and DNA.

In the **occult** sciences the golden ratio has been known since the time of Greek master mathematician “Pythagoras” in the 5th and 6th centuries BC.

Pythagoras and the [Pythagoreans](#) played their role as pioneers in their development of **mathematics** and for the application of mathematics to the concept of order (Livio,2002). They discovered that the golden ratio is symbolized by the ratios of line segments in a **pentagram** which is a five-pointed star drawn in one line, or a pentacle is the same star within a circle which **both** equal PHI.

In modern culture today, author Dan Brown takes this ancient message of the Pythagoreans to the masses in his best

In the Beginning...
Elohim said it was
“good”



DNA
The “Holy of Holies”
or
“Kingdom of God Within You”
or
“The Word”



Ark of the Testimony (X-Chromosome)

In the End...
Mankind said it was
“Not Good Enough”



seller

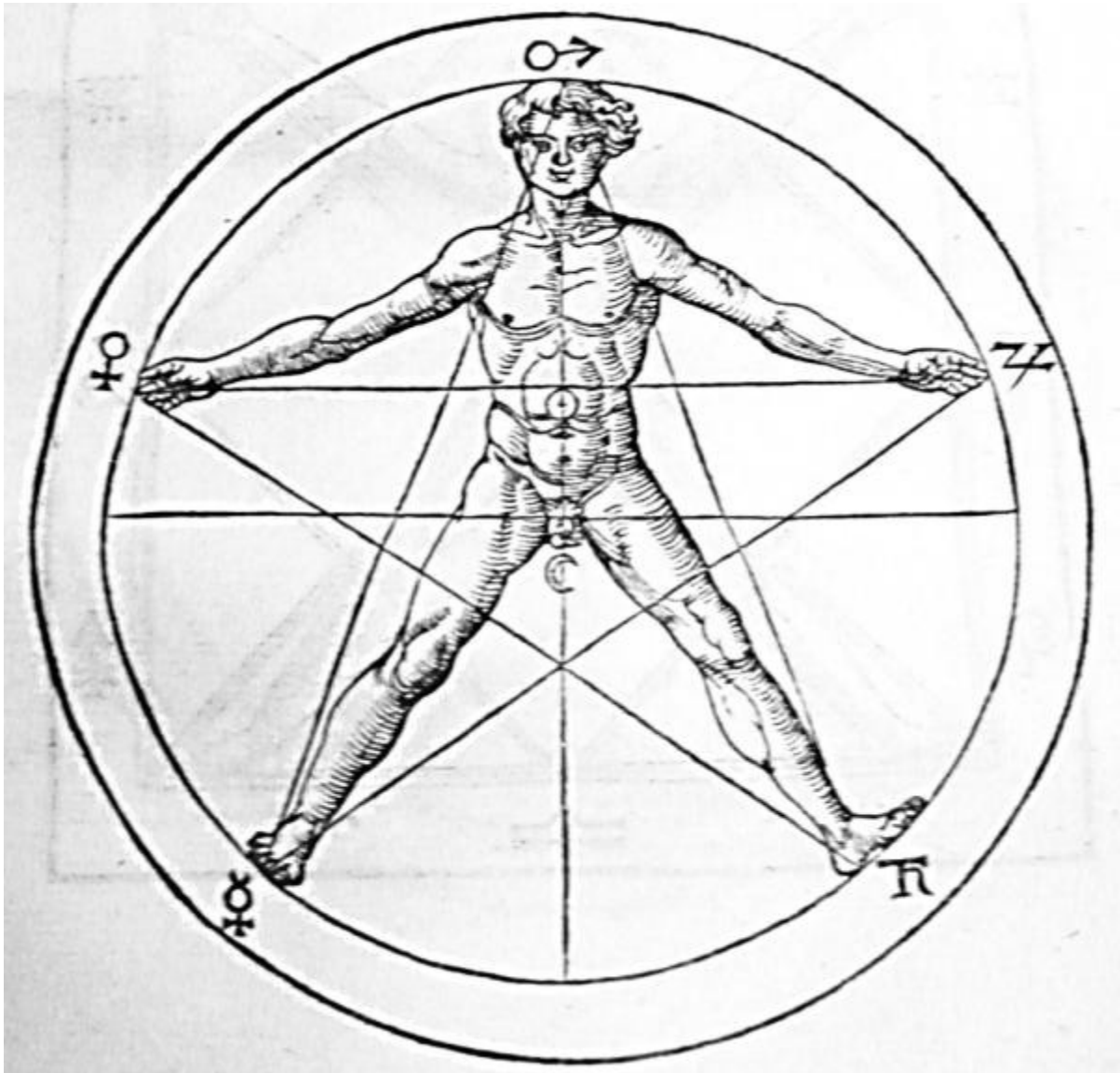
book “[The Da Vinci Code](#)“, where he cleverly uses PHI in how it relates to nature as it connects to religion, the **divine** feminine, art and architecture. Let’s just say that “The PHI is out of the bag.”

The number of man is based on Phi for the human body in the number 5, which in the occult world

b

is symbolized **as** an upright pentagram with two feet on the ground, two arms extended to the side and the head in the ascendant position to the heavens of the AS ABOVE. This upright pentagram represents that of the spiritual man or Christ who has **control** over his lower animal self. We then find the pattern of the number 5 that corresponds with the 5 elements in nature in the SO BELOW.

Here is an image of Man inscribed in a pentagram, from [Heinrich Cornelius Agrippa's *De occulta philosophia libri tres*](#). The five signs at the pentagram's [vertices](#) are [astrological](#).



If this pentagram figure is **reversed** such as in black magic with the two feet or points (horns) in the air and the head or point on the ground (descendant position), it signifies that the animal is paramount over the spiritual.

From our 5 limbs of the torso consisting of the arms, legs and head with each of the 5 limbs containing 5 appendages of fingers and toes that then operate in tandem with the 5 sensory organs of your head with your two eyes, ears and one mouth that in turn activate [the 5 senses](#) of sight, sound, touch, taste and

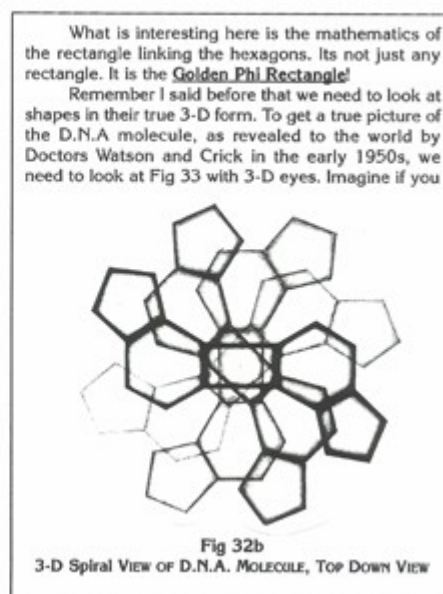
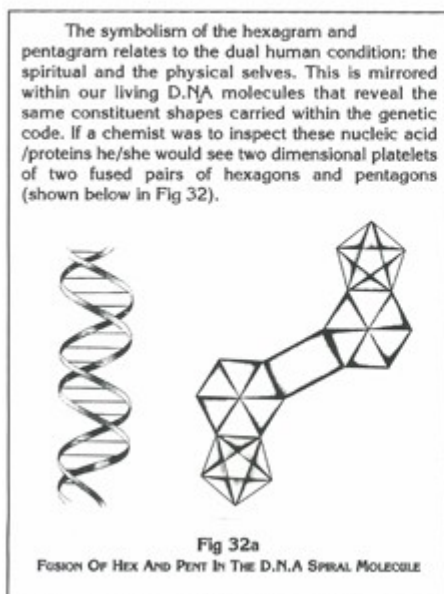
smell. Hence, as humans we operate most effectively when we use the [Golden Rule](#) to manage how we sense and learn using the math of $5 \wedge .5 * .5 + .5 = \text{Phi}$ or 1.6180339. When we humans live by the Golden Rule, this is when the philosopher or adept turns their DNA **lead** into DNA **gold** or when they become officially ‘enlightened.’

“Scientists” have “found” that [the height of one unit of the DNA helix](#) is related to its width in a proportion equal to the

Phi, Vedic Maths, Platonic Solids, Magic Squares and the Tetrahedral Nos.

48

IN THE NEXT DIMENSION, The Book of Phi, Vol. 2, JAIN, 2003



“The **Golden Spiral (Ratio)**” or the Fibonacci and Padovan number series that form the bridge from the number patterns found in in the double helix of DNA and a cross-sectional view of the [DNA molecule](#) from the top reveals two pentagons (whose angles are determined by the golden ratio).

The mathematical ratio of the PHI or the golden ratio has been found to be [the only mathematical](#)

Gold

configuration that can duplicate itself and ad infinitum without variance. Dr. Leonard Horowitz had demonstrated that DNA emits and receives phonons and photons, and one of the theories is that this golden spiral represents a geometrically encoded instructional pattern in our DNA and the brain that determines who we are, what we are, how we look and how we live.

This is what occurs in our cells and DNA that explains why our DNA holds the **lost secrets to our past**, and how in my mind I know we obtain Gnosis. As this infinite mathematical configuration and duplication occurs both in the universe and nature, it also occurs in man or DNA. ((Dr. Len Horowitz is a knighted Ambassador for the World Organization for Natural Medicine, ordained by Prince Michael of Russia, and appointed by officials of the Sovereign Orthodox Order of Knights Hospitaller (the Russian branch, not the Maltese branch) to advance the “Clinics For Humanity Project,” brainchild of Dame Commander, Dr. Sheila McKenzie, the Grand Priory of the Humanitarian Medical Order of Knight Hospitallers of North America. ---

<https://greganthonyjournal.wordpress.com/2009/03/17/len-horowitz-a-dark-doctor-in-disguise-remains-a-vatican-shill/>

<https://atrueott.wordpress.com/2011/06/22/sir-chevalier-leonard-g-horowitz-not-the-truth-exposed-hes-really-an-npd/>

<https://www.thepathoftruth.com/false-teachers/len-horowitz.htm>))

16th century German mathematician, astronomer and astrologer, [Johannes Kepler](#), (1571-1630) had said, “**Geometry has two great treasures**: one is the [Theorem of Pythagoras](#); the other, the division of a line into extreme and mean ratio. The first we may compare to a measure of gold; the second we may name a precious jewel.”

Watson and Crick were ordered to stop working on DNA after a quiet chat between William Bragg, head of the Cavendish Lab at Cambridge, **and** John Randall, his counterpart at King's. Wilkins wrote to Crick, suggesting they stay away. "Let's have some talks afterwards when the air is a little clearer. I hope the smell of **witchcraft** will soon be getting out of our eyes."

<https://www.theguardian.com/science/2010/sep/29/letters-dna-double-helix-francis-crick>

Sanger was a relatively unknown figure outside science. He was awarded the **Order of Merit by the Queen** in 1986. In 1962, he moved to the new Medical Research Council Laboratory of Molecular Biology along with leading scientists including Nobel laureates Max Perutz and Francis Crick and began working on the problem of sequencing DNA. His technique –

"dideoxy" or "Sanger" sequencing – is **still in use today** to read DNA code, including the 3bn base pairs of the first ever complete human genome sequence published in 2003. The **Wellcome (rothschilds)** Trust named the Sanger Centre after him, which is based in Cambridge and was the UK home of the international Human **Genome** Project. Jeremy Farrar, director of the Wellcome Trust, said: "I am deeply saddened to learn of the death of Fred Sanger, one of the greatest scientists of any generation and the only Briton to have been honoured with two Nobel prizes. Fred can fairly be called the **father** of the genomic era: his work laid the foundations of humanity's ability to read and understand the genetic code, which has revolutionised biology and is today contributing to transformative improvements in healthcare. We are honoured that the Wellcome Trust **Sanger** Institute, which has done so much to develop our understanding of the genome and apply it to medicine, bears his name, and that the Wellcome Library holds his papers for posterity."

<https://www.theguardian.com/science/2013/nov/20/dna-pioneer-fred-sanger-dies-genetics>

moved to their newly built Laboratory of Molecular Biology in Cambridge, together with M.F. Perutz's unit from the Cavendish Laboratory which included F.H.C. Crick, J.C. Kendrew, H.E. **Huxley** and A. Klug. more permanent colleagues, B.G. Barrell, A.R. Coulson and G.G. Brownlee ..

<https://www.nobelprize.org/prizes/chemistry/1980/sanger/biographical/>

((Planned Parenthood: The Racist Legacy of Margaret Sanger <https://hospicepatients.org/alchemy-eugenics.html>))

Frederick Sanger OM CH CBE FRS FAA (13 Aug 1918 – 19 Nov 2013) Sanger's **father** converted to **Quakerism** soon after his two sons were born and brought up the children as Quakers. Sanger's **mother** was the daughter of a wealthy cotton manufacturer and had a Quaker background. .. Sanger's beliefs were strongly influenced by his Quaker upbringing. He was a pacifist and a member of the **Peace Pledge Union**. It was **through** his involvement with the Cambridge Scientists' Anti-War Group that he met his **future** wife, Joan Howe ... In Chibnall's group he was initially supported by the Medical Research Council **and** then from 1944 until 1951 by a **Beit** Memorial Fellowship for Medical Research. .. From 1951 Sanger was a member of the external staff of the Medical Research Council Elected Fellow of the Royal Society (FRS) in 1954. **Commander** of the Order of the British Empire – 1963 Order of the Companions of Honour – 1981 Order of Merit – 1986 .Albert Lasker Award for Basic Medical Research – 1979 ... As noted in his obituary, he had described himself as "just a chap who messed about in a lab", and "academically **not**

brilliant".

https://en.wikipedia.org/wiki/Frederick_Sanger

Hugh Esmor **Huxley** MBE FRS (25 February 1924 – 25 July 2013) was a British molecular biologist . Second World War, during which he served in the Royal Air Force. .. Member of the Order of the British Empire (MBE). ..

https://en.wikipedia.org/wiki/Hugh_Huxley

https://en.wikipedia.org/wiki/Huxley_family

[http://www.freemasons-freemasonry.com/
from_darkness_to_light.html](http://www.freemasons-freemasonry.com/from_darkness_to_light.html)

<https://www.africaresource.com/rasta/sesostris-the-great-the-egyptian-hercules/the-masonic-royal-society-of-sciences-and-the-arts/>

[https://en.wikipedia.org/wiki/John_Randall_\(physicist\)](https://en.wikipedia.org/wiki/John_Randall_(physicist))

founded the **new** science of X-ray crystallography. Bragg was elected Fellow of the Royal Society in 1907, vice-president in 1920, and served as President of the Royal Society from 1935 to 1940. He was appointed Commander of the Order of the British Empire (CBE) in 1917 and Knight Commander (KBE) in the 1920 civilian war honours. He was admitted to the Order of Merit in 1931.

https://en.wikipedia.org/wiki/William_Henry_Bragg

The Watson-Crick structure was a proposal, **based upon—and** therefore supported by—the data of Rosalind Franklin, Raymond Gosling, and Maurice Wilkins published alongside it. Definitive proof of the structure, however, took almost **another quarter of a century**, owing to the difficulty of synthesizing small stretches of DNA in the form of single crystals.

Watson and Crick's first communication was exceedingly brief and went over the heads of most biologists, unfamiliar as they were with x-ray crystallography. The second paper, written largely by Crick, brought their proposal down to earth because it explained the relevance of their unusual two-stranded model to biologists. There they explained'

The precise sequence of the bases [on one chain] is the code which carries the genetical information. If the actual order of the bases on one of the pair of chains were given, one could write down the exact order of the bases on the other one, because of the specific pairing.

*Thus one chain is, as it were, the complement of the other, and it is this feature which suggests how the deoxyribonucleic acid molecule **might** duplicate itself. .*

*. . The **hypothesis** we are suggesting is that the template is the pattern of bases formed by one chain ... and that the gene contains a complementary pair of such templates. (Watson and Crick, 1953b, p. 966, 967)'*

But could DNA carry the enormous variety of genetic determinants involved? Providing the pairing rules were followed, any conceivable sequence was possible on

one chain, the other carrying the complementary sequence. Here was **speculation on a grand scale**. Despite all the excitement about DNA—the steady stream of visitors coming to see the model, among them Pauling from California **and** Gerald Pomerat from the Rockefeller Foundation—the impact of Watson and Cricks proposal within the Cavendish laboratory was mixed. Members of the university’s Subdepartment of Crystallography—quite distinct from the Medical Research Council Unit—were **unimpressed**.

Given that the gene’s specificity or “information” is encoded in a base sequence of DNA, how is that translated into the immediate gene product: a polypeptide chain composed of a specific sequence of amino acids? Stimulated by the physicist George Gamow, Crick joined in the effort to use **cryptography** to solve the problem, but all the schemes considered suffered from limitations on the variety of possible amino acid sequences. Nature’s proteins showed no such limitations.

Cogitating on the coding problem, Crick began to ponder the relation between the nucleic acids and the proteins, and to make this the subject of his lecture, “On Protein Synthesis,” delivered to the Society for **Experimental** Biology in 1957. Here he laid out the framework that was to constitute the **core** principles of what became the classical period of molecular biology. First came the *Sequence Hypothesis* stating that “the specificity of a piece of nucleic acid is expressed solely

by the sequence of its bases, and that this sequence is a (simple) code for the amino acid sequence of a particular protein” (1958, p. 152). Second came the Central Dogma: “the transfer of information from nucleic acid to nucleic acid, or from nucleic acid to protein **may** be possible, **but** transfer from protein to protein, or from protein to nucleic acid is impossible. Information means here the *precise* determination of sequence ...” (p. 153).

Given these restrictions on information transfer, how can a match be achieved between a triplet of bases and the amino acid for which the triplet is the cipher? Crick had already discussed this problem earlier and had **suggested** the existence of “adaptor molecules,” small molecules with hydrogen-bonding sites attached to the appropriate amino acid by special enzymes. His prediction was fulfilled by the discovery of transfer RNA (tRNA).

This framework served its purpose admirably at the time. The **extraordinarily complex** picture that has since emerged has understandably introduced qualifications. But the discovery??? in 1970 of a type of RNA that can transfer sequence information back to DNA (**reverse** transcriptase) did not flout Crick’s definition of the Central Dogma. The great surprise came **eight** years later. This was the discovery that whole chunks of the RNA transcribed from the gene are often excised before translation of the message into protein begins. Crick commented on these discoveries, accepting that the early ideas were too simple. In this

sense he admitted that some of his critics were proved right.

When **Sydney Brenner** (Sydney Brenner CH FRS FMedSci MAE (13 Jan1927 – 5 Apr 2019) .. CH = The Order of the Companions of Honour is an order of the Commonwealth realms. It was founded on 4 June 1917 by King George V . Founded on the same date as the Order of the British Empire, it is sometimes regarded as the junior order to the Order of Merit. Grand Cordon of the Order of the **Rising Sun** in 2017) joined the MRC Unit in 1957, their remarkable collaboration began. Also attracted to the unit as visitors that year were the world experts on the genetics of bacterial viruses (bacteriophages or “phages”) Seymour Benzer **and** George Streisinger. They attempted to discover the code by establishing the base sequence in a gene and the corresponding amino acid sequence in its protein product. But Crick and Brenner continued their own study of the genetics of phage mutations.

In February 1961, Crick began a series of experiments based on an **idea** he had about the manner in which a mutation can be “suppressed” by a further mutation. The results led him to support Brenner’s suggestion that such “suppressions” are due not to *substitution* of a different base in a sequence of bases on the DNA molecule, but to *addition* or *deletion* of a base. After conducting extensive ?experiments? for some five months, Crick attended a meeting in the Alps. There he mentioned this **idea**, and the **hypothesis** “that the code is read in short groups, starting from one end of the

gene. The exact starting point is supposed to determine which group is read” (Crick, 1961a, p. 188).

Back in Cambridge Crick carried out further experiments to clinch the case for the “short groups” being composed of three bases or a multiple thereof. In their classic paper summarizing this work, the Cambridge group claimed that the genetic code “is of the following general type”: three bases (or a **multiple** of three) codes for one amino acid. It is not an overlapping code, “probably ‘degenerate’; that is, in general, one particular amino-acid can be coded by one of several triplets of bases,” and “the sequence of the bases is read from a fixed starting point.... There are no special ‘commas’ to show how to select the right triplets” (Crick et al., 1961, 1227).

Meanwhile he had listened in Moscow to Marshall **Nirenberg** describe the stunning result of his work with Johann **Matthaei** on the synthesis of the polypeptide polyphenylalanine (polyPhe), using as template the synthetic RNA polyuridylic acid. PolyU, they concluded, codes for polyPhe. The Cambridge group had revealed the general nature of the code, and Nirenberg and Matthaei had identified the specific cipher for one of the twenty amino acids.

This discovery of the code was the last time Crick worked at the bench. After exploring embryological development with Peter Lawrence, he turned to the **mysteries** of the chromosome, excited by the discussions ongoing over the enormous amount of

nongenetic DNA therein. Here was a chance to provide a model the structure of which might suggest why there is so much repetitive DNA in chromatin and how gene expression is regulated. Unfortunately his structure was proved to be entirely wrong, but it served as the stimulus to attract Roger Kornberg **and** Aaron Klug to the subject. Kornberg turned the field upside-down by situating the histone on the inside of the chromosome in the form of beads (nucleosomes) and around these beads the DNA is wound. Crick went on to collaborate with **Klug** on a model that could achieve the ten-thousand-fold compacting suffered by human chromosomes during nuclear division.

From 1959 he had helped Jacob Bronowski **and** Jonas Salk formulate the plans for the projected Salk Institute in La Jolla, California, and was a nonresident fellow to the institute from 1962 until 1974. The academic year 1976–1977 he spent on sabbatical there. In 1977, he accepted the position of Kieckhefer Distinguished Professor at the Salk, holding it for the rest of his life. Although he avoided whenever possible undertaking administrative work and sitting on committees, he was a powerful influence in deciding policy both in Cambridge and in La Jolla. He refused honorary degrees, the CBE, and a knighthood, but in 1991, he accepted the very exclusive **Order of Merit from Queen Elizabeth II**. However, he has frequently been referred to erroneously as Sir Francis and even as Lord Crick.

The Brain and Consciousness . For many years Crick had been following developments in neurophysiology from a distance. It was the move to California that helped him to extricate himself from old agendas and turn to new ones. His long-term goal was to tackle “the problem of consciousness,” concentrating on visual perception in primates. He had “rather little expectation of producing any radically new **theoretical** ideas at such an advanced age,” but he thought he “might interact fruitfully with younger scientists.” At this time in his life, he felt he “had a right to do things” for his own **amusement**, so long as he “could make an occasional useful contribution” (*What Mad Pursuit*, p. 152).

He approached the subject without prejudice, ready to consider **mathematical**-computational and physiological approaches. Having Tomaso **Poggio**, David **Marr**, and Graeme **Mitchison** visit and work with him at the **Salk** Institute, he immersed himself in the **computational** approach. But he became skeptical of some of the **mathematical** modeling of visual processing. His strongest criticisms were directed at those cognitive psychologists who showed no concern for the **lack** of biological realism in their schemes. Repeatedly he stressed how inappropriate was the analogy drawn between the standard digital computer and the brain. And when he joined the group in the Psychology Department of the University of California at San Diego studying **parallel** distributed processing—as distinct from the **serial** processing of

standard computers—he repeatedly stressed the need to consider whether their schemes were applicable to the manner in which the brain is wired. (Mathematical = computational = **theoretical** = baseless)

An example of a computational approach that led to an interesting **hypothesis** was Crick and **Mitchison's** paper on the function of dreaming. They found that computer **simulations** of neural nets when subjected to heavy use become overloaded and unable to continue functioning normally. Cutting off any input, and permitting the nets to cycle over and over, mysteriously restored normal function. Might this not happen in the brain also? Is that what happens when people dream, sensory input being cut off, and rapid eye movements (REM sleep) occurring? Accordingly they **suggested** that the function of REM sleep is to “unlearn” unwanted “modes of excitation.” They called it “reverse learning.” **Pure theory.**

Crick laid most emphasis upon physiological and anatomical approaches to the brain, for these involved opening the “**black box.**” He had been delighted at the way David Hubel **and** Torsten Wiesel used the technique of single-cell?? recording to reveal the “functional anatomy” in the visual centers of the brain. Looking ahead, he urged that greater effort be put into developing new techniques for unraveling the brain's immensely intricate anatomy.

For the last fourteen years of his life, Crick collaborated with Christoff **Koch**, professor of cognitive and behavioral biology at Caltech, on the subject of

consciousness. Putting **aside** the difficult problem of explaining how neural events can yield the subjective states of consciousness known as qualia, they looked for the neural correlates of consciousness (NCC). What particular neural activity is present during conscious activity, but absent from activity that is not conscious? Their ambition was to achieve a “framework” that would do for consciousness what the DNA double helix did for molecular biology.

This framework, they claimed, was the first “coherent scheme for the NCC.” Underlying it was the idea of **competing** coalitions of neurons, some at the back of the brain, others at the front. The mechanisms of attention “bias the competition among these nascent coalitions.” Crick had the **conviction** that most of what people assume is conscious activity is in fact zombie-like activity. People have the sense of consciously coming to decisions, **but** they are really the product of unconscious computation. What they are conscious of is **only** the end result of that computation. As for the function of consciousness, Crick and Koch suggested it serves “to produce the best current **interpretation**” of the sensory data. Like an “executive summary” it overcomes the problem of data overload thus making possible a swift response.

Crick as Author . From the earliest of his scientific papers, Crick showed good organization and clarity of expression. Not surprisingly, he was the one asked to write the first draft of so many of the jointly authored papers. In writing for **general** audiences, he knew how

to explain the science at their level without being condescending. He started several book projects, but traveling so frequently to meetings and being on the international lecture circuit he was rarely sufficiently settled to carry them through. His first book *Of Molecules and Men* contained his John Danz lectures. They were devoted to critiquing vitalism by marshaling the successes of molecular biology. The lectures ended with a denunciation of religious education, denial of the existence of an immortal soul, and a prevision of “a time when vitalism will not seriously be considered by educated men” (p. 99).

Very different in tone was *Life Itself: Its Origin and Nature*. This was distilled from his many discussions with **Leslie Orgel**, his colleague at the **Salk** Institute, and **enlarges** on an **idea** they had in 1973 and called “directed panspermia.” They **suggested** that life did **not** originate on this Earth, but was brought to it in the form of microorganisms carried in an unmanned spaceship from a “**higher** civilization” elsewhere. This would account for the fact that the genetic code on this Earth is universal, barring a few trivial variants. It assumes that the primitive environment of the Earth was too hostile for the emergence of life here. As an exercise in **imagination** it was intended to provoke the reader. Crick **doubted** whether it was likely to be true. Asked by the **Sloan** Foundation to write about his life, Crick decided to use his experiences “to teach some general lessons about how research is done, and what

mistakes to avoid.” Hence, the book begins with a quotation from **Oscar Wilde**: “Experience is the name everyone gives to their mistakes.” The book’s title he took from his first public talk on the structure of the proteins: *What Mad Pursuit*. Crick described the experience early in his career at Cambridge of witnessing Bragg’s failure to discover the **alpha helix** that made such a deep impression on him. The most striking error he identified was that of **assuming** that the nucleoprotein particles in the cytoplasm, later called ribosomes, contain the genetic message. Here, fortunately, aided by their colleague **Francois Jacob** from the **Pasteur** Institute, Crick and Brenner were among the first to realize there **must be** a separate RNA messenger (mRNA). ((Albert Franck, Jacob's maternal grandfather, a **four-star general**, was Jacob's childhood role model. At seven he entered the Lycée Carnot, where he was schooled for the next ten years; in his autobiography he describes his impression of it: "a **cage**". .. For his **wartime** service, he was awarded France's WWII highest decoration for valor, the Cross of Liberation, as well as Légion d'honneur and croix de guerre. ..))

His last book, *The Astonishing Hypothesis*, was the product of his long-felt need to **reconstitute** the moral and legal framework of **society** on a scientific **basis**. Hence the need to understand human nature, but to achieve this, he claimed, requires a scientific understanding of the nature of consciousness. Only then can people hope to understand humanity’s place in

nature. Continuing with outmoded concepts will only lead, he foresaw, to a world so **overpopulated** as to spell disaster. After explaining with consummate skill many of the complex features of the brain, he ended with “Dr. Crick’s Sunday Morning Service.” Here he expressed his hope that scientific research will make it possible to argue that “the idea that man has a disembodied soul is as unnecessary as the old idea that there was a Life Force” (p. 261).

<https://www.encyclopedia.com/people/science-and-technology/genetics-and-genetic-engineering-biographies/francis-harry-compton-crick>

The Drug:

LSD. Yes, when not discovering the key to life, and winning the Nobel Prize for it, Crick spent the 50s and 60s throwing **all night parties** famous for featuring that era's favorite party favors: LSD and **nudity**. Crick **never** made it a secret that he experimented with the drug, and in 2006, the London paper *The Mail on Sunday* reported that Crick had told many colleagues that he was experimenting with LSD when he figured out the double helix structure.

Why It Makes Sense:

The double helix is essentially the Sgt. Peppers of scientific models, a ladder that's been melted and twirled by a pasta fork, or the two snakes from the caduceus if one of them was f*****g the other with **100**

dicks (depending on whether the artist ate the good or bad acid).

Now obviously scientists don't arrive at models by doodling on their trapper keeper and picking out the shape that looks the coolest. To do what Crick did required an insane amount of analytical, **theoretical**, and spatial thinking. It's not like Crick dropped out of high school and then used acid to turn himself into a supergenius.

Crick was a **fan** of Aldous Huxley's *The Doors of Perception*, a study of the human mind which was undertaken like all good studies, while driving around LA on mescaline. *The Doors of Perception* is a book by Aldous Huxley. Published in 1954, it elaborates on his psychedelic experience under the influence of mescaline in May 1953. <https://maps.org/images/pdf/books/HuxleyA1954TheDoorsOfPerception.pdf>

Huxley wrote that the sober mind has a series of filters on it that basically prevent abstract thought (evolution put them there for the sake of survival, since having daydreams about the nature of the universe while driving can cause you to plow into a semi). But Huxley and Crick **thought/ claimed** drugs like mescaline and LSD could temporarily remove those filters.

So rather than melting his mind into a lava lamp of trippy shapes, Crick probably used LSD to get unfiltered access to a part of his brain most normal people rarely use. ((IF this is the case how come he

arrived at the so called ancient kabbalah / hermeticism / caduceus))).

The long term effects of acid aren't so great. While Crick **never** officially rocked a **tinfoil hat**, he was known to argue that life was seeded on Earth by a race of prehistoric **aliens**, a theory that has yet to gain widespread acceptance among the scientific community.

https://www.cracked.com/article_16532_the-5-greatest-things-ever-accomplished-while-high.html

SEE THE OTHER 4 -- PSYCHOANALYSIS,
MOSES ...

https://en.wikipedia.org/wiki/Maurice_Wilkins

Mario Capecchi = Mario Ramberg Capecchi (Verona, Italy, 6 October 1937)

Son of Luciano Capecchi (son of ???) , **and** Lucy Ramberg (daughter of Lucy Dodd Ramberg = **Lucy Ethel Ramberg (Dodd)**

and German archaeologist Walter Ramberg. -- had three children: Walter, **Lucy** and Edward.) (Lucy Ethel Ramberg (Dodd) Daughter of Charles H. Dodd **and** Lucy Augusta Dodd)

In 1946 his uncle, Edward Ramberg, an American physicist at RCA, sent his sister money to return to the United States. He and his mother moved to Pennsylvania to live at an "**intentionally cooperative**

community" called Bryn Gweled, which had been co-**founded** by his uncle. (Capecchi's **other** maternal uncle, Walter Ramberg, was also an American physicist who served as the tenth president of the Society for Experimental Stress Analysis.) He graduated from George School, a **Quaker** boarding school in Bucks County, Pennsylvania, in 1956.

Mario **Capecchi** = **protégé** of James **DEWEY** Watson – jdww was brash - & He received NIH funding for **all** of the projects.. His career, like the new discipline, was nurtured by James D. Watson .. Capecchi's **grandmother**, Lucy Dodd .. **Her** father, who'd gained considerable wealth trading with Japan and **China** . Mother, Lucy Ramberg, was a poet; father, Luciano Capecchi, an officer in the Italian Air Force. This was a time of extremes, turmoil and juxtapositions of opposites. They had a passionate love affair, and my mother wisely chose not to marry him.

At home, "most conversations at the dinner table were **political**." Edward **Ramberg** was a physicist at the Princeton RCA Research Laboratory who worked out the **theory** behind the **electron microscope** and helped build the **first** one. At the RCA laboratory, he also was involved with making both black-and-white and color **televisions**. Rather than encouraging Capecchi to go to college, Ramberg used "subliminal indoctrination" to persuade his **nephew** of the value of science. That, coupled with **Quaker** emphasis on social responsibility,

convinced Capecchi to study political science. .. Capecchi never took a biology class; "I learned about biology in the labs." For his practical experience, he worked several terms at the Massachusetts Institute of Technology (MIT). Once, he worked with Charles "Pop" **Kettering**, a "very curious" man who dismantled an experimental machine Capecchi had worked three months to construct. Incredulous, Capecchi watched, later admitting that "it was fun watching Kettering and his excitement at seeing how it worked." .. Capecchi's **uncle**, Edward Ramberg. A **founder** of Scientists for Social Responsibility ... influenced by the Quaker belief in social responsibility. ... **Overpopulation** is of far more concern to the researcher. "In the long run, that will be our most critical problem. It's going to put enormous strains on this planet. How will we maintain an increasing population base?" ...

[https://learn.genetics.utah.edu/content/science/capecchi/politics or science](https://learn.genetics.utah.edu/content/science/capecchi/politics%20or%20science) ????

https://en.wikipedia.org/wiki/Mario_Capecchi <https://www.nobelprize.org/prizes/medicine/2007/capecchi/biographical/>

RCA = A DIVISION OF TAVISTOCK INSTITUTE

Famous Masons

<http://www.highland762.com/famous.html>

Edward G. Ramberg (June 14, 1907 in Florence, Italy – January 9, 1995) was an American physicist who contributed to the early development of electron

microscopy and color television. His father was killed while serving in World War I. his six-volume Lectures on **Theoretical** Physics. ..

The Right Club was secret society, part of a constellation of reactionary right-wing social clubs that existed in England prior to the beginning of World War II. A “patriotic society” whose upper- and middle-class members would gather for dinners and rousing discussions of the “Jewish problem,” it was founded by a well-connected Scottish aristocrat and parliamentary nonentity named **Capt.** Archibald Henry Maule Ramsay <https://www.tabletmag.com/jewish-arts-and-culture/books/135982/english-nazi-club-revealed>

“Phlogiston”

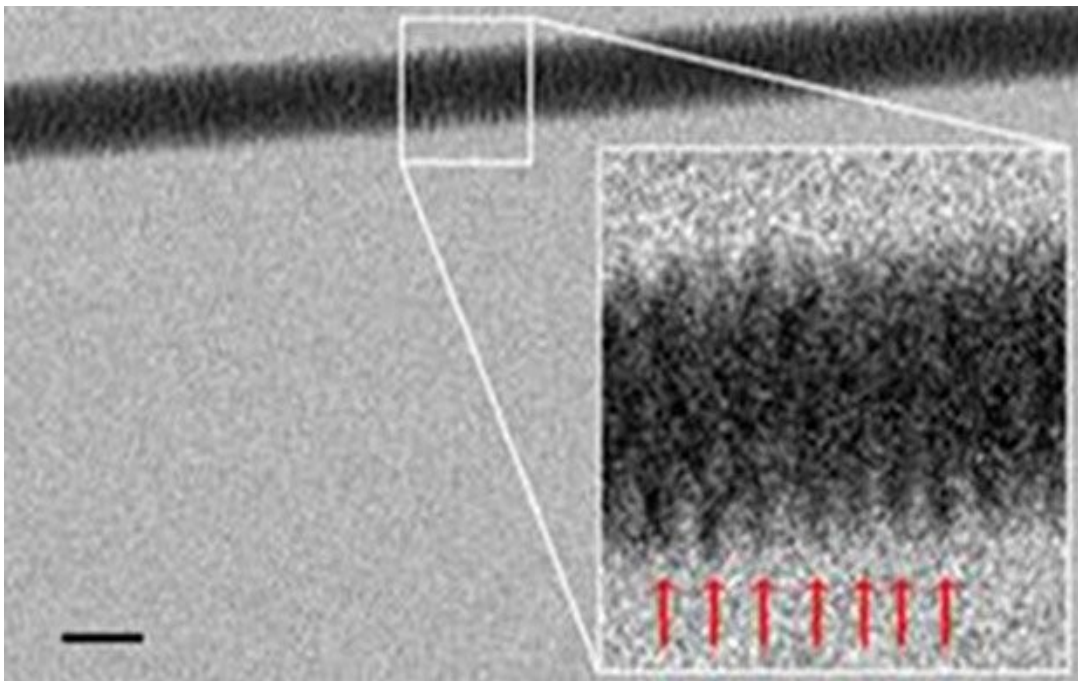
A **Theosophical** Master wrote: “We believe in the much laughed at phlogiston (see article “What is force and what is matter?“), and in what some natural philosophers would call *nisus* the incessant though perfectly imperceptible (to the ordinary senses) motion or efforts one body is making on another — the pulsations of inert matter — its life.”

“Matter (or nature) acting by her own peculiar energy, *must have always existed — its materials ever changing form, combinations and properties, but its principles or elements being absolutely indestructible.*

The connection between phlogiston and plasma can also be seen in another letter from The Master K.H.:

“What are those long white filaments twisted like so many **ropes**, of which the penumbra of the Sun is made up? What the central part that is seen like a huge flame ending in fiery spires, and the transparent clouds, or rather vapours formed of delicate threads of silvery light, that hangs over those flames — what — but magneto-electric aura — the phlogiston of the Sun?” [5]
<https://theosophywatch.com/2018/12/21/solstice-secrets-the-turning-of-an-electric-sun/>

Scientist Snaps First Ever Photograph of DNA's Double Helix



An interesting photographic first has been announced by a scientist at the University of Genoa in Italy. Enzo di Fabrizio revealed the **world's very first true photograph** that shows the double helix structure of DNA, shown above.

Di Fabrizio and his colleagues developed a new technique of imaging the **molecules**, which contain genetic instructions and are used by all known living things for development and functioning.

Prior to the scientists' breakthrough, which was published in the scientific journal *Nanoletters*, DNA's double helix structure could **only** be detected by scattering X-Rays off **atoms** in DNA with a technique known as X-Ray crystallography. Di Fabrizio's method uses a **scanning** electron microscope, which, as its name suggests, involves scanning the tiny subject with a focused beam of **electrons**.

Here's the technical low-down of their technique, according to **Roland Pease of New Scientist**:

*The **trick** used by Enzo di Fabrizio at the University of Genoa, Italy, and his team was to snag DNA threads out of a dilute solution and lay them on a bed of nanoscopic silicon pillars. The team developed a pattern of pillars that is extremely water-repellent, causing the moisture to evaporate quickly and leave behind strands of DNA stretched out and ready to view. The team also **drilled** tiny holes in the base of the nanopillar bed, through which they shone beams of **electrons** to make their high-resolution images.*

<https://petapixel.com/2012/11/30/scientist-snaps-first-ever-photograph-of-dnas-double-helix/>

ALL THEORETICAL. ALL FRADULENT CLAIMS . NO ONE HAS SEEN ANY ATOMS , ELECTRONS !!!!!!!!!!!!!!!

<http://atam.org/scorpio/>

<http://atam.org/scorpio-serpens-part-2/>

<http://atam.org/scorpio-ophiuchus-part-3/>

<http://atam.org/scorpio-hercules-samson-part-4/>

The Milky Way Galaxy our **Solar System** is a Double Helix strand Dna.

Our Majestic DNA: The Vast Universe Within Each of Your 37.2 Trillion Cells What is DNA and How Does It Work?

<https://drbrucekehr.com/double-helix-science-spirituality-dna-gene/>

<http://adepts.light.org/2012/05/15/in-our-dna-hermetic-tradition-and-occultmetaphysical-confusion/>

[www.anandgholap.net/Evolution And Occultism-AB.htm](http://www.anandgholap.net/Evolution_And_Occultism-AB.htm)

Hitler's National Socialism and Mussolini's Fascism received massive support from the élitist Masonic establishment in the West. While Freemasonry was officially banned in Germany and Italy, key positions were nevertheless given to Masons – e.g. Hjalmar Schacht controlled the **entire** economic financial-industrial system of Nazi Germany. While Mussolini wanted to give his regime as a whole a ritualistic, Masonic character. Heinrich Himmler, Reichsführer SS, surrounded himself with twelve Gruppenführer in the

castle of Wewelsburg, where occult meditative exercises were practised, and initiation-like processes took place at the nearby site of the Externsteine.

The genocide of the Jews can be explained on different levels. First, to make way for the superior race of Aryans. And secondly, it was believed that a human sacrifice on **such a scale** could endow the executioners with special powers. And it was progressive, democratic Freemasonry, represented by Roosevelt and most notably by his **wife** Eleanor, which set a new course for humanity after the war through the ratification by the U.N. Organization of the Universal Declaration of Human Rights. The Chapter closes with a reference to two outstanding representatives of progressive Freemasonry: Mahatma **Gandhi** who, like Eleanor Roosevelt, was a member of the Ur-Lodge "Thomas Paine", and Martin Luther King, member of the Ur-Lodge "Hiram Rhodes Revels".

Few know, in fact, that Mohandas Karamchand **Gandhi** (1869-1948), known as the "Mahatma" (the "Great Soul") passed through various free-**masonry** experiences, the most significant of which were probably the Ur-Lodge initiation "Thomas Paine" (1894) and then the **creation** of the Ur-Lodge "Arjuna-Phoenix" (1904), operating over time above all between India, Africa and the western world. Thus, assimilating the work still in progress of his brother Gioele Magaldi to that of his brother Mohandas Karamchand **Gandhi**

(both passed between the columns of the Ur-Lodge "Thomas Paine", after more than about 116 years between the one and the other affiliation), has a symbolic character- archetypal exception.

There are **conservative** Ur-Lodges – the “Edmund Burke”, the “Joseph de Maistre”, the “Compass Star-Rose” and the “Pan Europa”, the “Three Eyes”, the “White Eagle” just to name a few – and there are **progressive** ones, starting with the “Thomas Paine” and continuing with the “Montesquieu” the “Christopher Columbus”, the “Ioannes”, the “Hiram Rhodes Revels” and the “Ghedullah”. All with an international mission, just as their field of intervention in the world is international.

From the “Thomas Paine” have come Freemasons who made the history of Italy and of the planet, such as Giuseppe **Mazzini**, Giuseppe Garibaldi (who was also the **first** Grand Master of the Grande Oriente d’Italia), John Stuart **Mill**, Victor Hugo, Jules Michelet, Louis Blanc, Pierre-Joseph Proudhon. But also Charles **Darwin**, John **Dewey**, George Bernard **Shaw**, Alexander F. **Kerensky**, John Maynard **Keynes**, Mahatma **Gandhi**, George **Orwell**, Altiero Spinelli, Nelson **Mandela**, Arthur Schlesinger Jr., Eleanor **and** Franklin Delano Roosevelt, who was however, **also** closely connected to the Grand Lodge of New York State and was in fact initiated in 1911 within the “Holland Lodge” No.8 in the Orient of the Big Apple.

These names are enough to convey an idea of the immensely rich history and the international significance of this super-clique of super-Brothers.

“Thomas Paine”, the **oldest** Ur-Lodge in the world (founded in 1849-50). And here we must explain what the Ur-Lodges are, whose existence, revealed for the **first** time in these pages, was for a century and a half one of the most closely-guarded secrets of modern Freemasonry. The super-Lodges, says Magaldi, are the “Masonic cliques actively guiding contemporary history”, that is, “groups and individuals with an orientation and a mission structured on a supra-national and cosmopolitan level”. And they have “outstripped by far the modest influence of ordinary Freemasonry”.

“Ordinary Freemasonry is that embodied in the circle of the Grand Lodges (federations of Lodges which, generally speaking, employ the same ritual) and of the Grand Orients (federation of Lodges which often choose to employ different rituals but are self-administering in a unitary and centralized manner) , organized on a national basis and standing in international diplomatic relations with other Masonic bodies.

Isis. The Egyptian goddess. Patroness of magic and of spiritual and material power, feminine cosmic counterpart of the god Osiris. She who in esoteric myths and rituals, is often made to coincide with another

goddess: Hathor. – “Hathor Pentalpha”, the Lodge of vendetta and blood-thirst.

son of George Herbert Walker Bush, 41st President of the U.S.A., founder of “Hathor Pentalpha” and father of George W. Bush, President no. 43, also a member of “Hathor Pentalpha”.

‘Cold War’ was coined by Freemasons George Orwell, Walter Lippmann and Bernard Baruch. This culminated in the forming, in 1949, of two opposing German States – the Federal Republic in the West and the German Democratic Republic in the East. (It was the Eastern bloc, where Freemasonry remained active, that Angela Merkel and Vladimir Putin – both born in the 1950’s – were to undergo Masonic initiation in the same Ur-Lodge “Golden Eurasia”, thereby laying the ground for their later prominence as political leaders.) Polarization of East and West was deepened further through the formation of the North Atlantic Treaty Organization (NATO) in 1949 and of the Warsaw Pact in 1955. But a Masonic background was **shared** by leaders on **both** sides of the ‘Iron Curtain’: Grotewohl, Pieck, Walter Ulbricht in the East, **and** Konrad Adenauer and Theodor Heuss in the West. In the 1950’s **new** “**para-Masonic**” organizations were formed at the instigation of leading Freemasons. David Wills (of tobacco fame) set up the **Ditchley** Foundation; and the **Bilderberg** Club was founded by a group comprising Jozef Retinger, Bernhard van Lippe Biesterfeld, H. J. Heinz

II, Paul Henry Nitze, David Rockefeller, Dennis Healey etc. **Progressive** Freemasons such as F. D. Roosevelt, John Maynard Keynes, George Catlett Marshall (of the Marshall Plan), William Beveridge and **Clement Attlee**. However, in **parallel** to this, there was a sharpening of conflict between the Capitalist and Communist blocs, as manifested in the **forming** of the Chinese People's Republic versus the regime in Taiwan, and in the Korean War 1950-53.

A number of leading personalities (Freemasons) in the 18th and 19th centuries had raised the idea of a **United States of Europe**: Montesquieu, Voltaire, George Washington, G. De la Fayette, Mazzini, Victor Hugo, Garibaldi. The idea was put forward by Garibaldi, Hugo, John Stuart Mill, M. **Bakunin** in 1867 at a Congress of the **League** for Peace and Liberty held in Geneva. But it was not until after the 1st World War that R. von Coudenhove-Kalergi succeeded in embodying the impulse in an institution: the International pan-European Union, in 1922, the **first** congress of which was held in Vienna in 1926. The movement drew towards it Freemasons of all political directions, and from 1924 was generously **funded** by (Mason) Max Warburg. It attracted many eminent personalities, including Freemasons Otto von Habsburg, Hjalmar Schacht, Louis Nathaniel de Rothschild, Konrad Adenauer, Rainer Maria Rilke, Paul Valéry, Thomas **Mann**, Felix Warburg, Stefan Zweig, Sigmund **Freud**, Albert **Einstein**, A. Karenski, Jean Monnet, Aristide Briand, John Maynard Keynes etc. French

Prime Minister Aristide Briand was invited in 1930 to present to the **League** of Nations a memorandum on the question of Federal European Union.

Nazi “regime” was vehemently opposed to anything of a multi-racial, multi-ethnic or multi-cultural nature.

After the war, the idea was taken up again by Freemasons such as Winston Churchill, Allen Welsh Dulles, Jean Monnet, K. Adenauer, Robert Schuman, Maurice Schumann, Otto von Habsburg, but was now starting to turn in a more elitist, technocratic direction.

Kalergi, together with his friend Otto von Habsburg organized in Switzerland in 1947 the **first** congress of the European Parliamentary Union – This **led** to the Council of Europe. It was due in large part to Jean Monnet, also at the urging of Masonic circles in the U.S.A., that efforts were made to draw together the coal **and** steel industries of France and Germany. The élitist, technocratic system that this entailed, led George **Orwell** to express it in literary form. In ‘Animal Farm’, published in 1945, he had described the totalitarianism of Stalinist Communism. But from 1947 he “warned” of totalitarian tendencies that could arise in the liberal-democratic West. Of particular interest to Orwell were the theories of mass psychology used by (Freemason) Edward Bernays and others to influence public opinion, although there was a **contrasting** system developed by (Mason) G. H. Gallup (of the Gallup poll), based upon a more optimistic view of human nature.

Kalergi was honoured in 1972 (the year in which he died) through the choice of the anthem he had proposed

for the European Community: the last movement of the 9th Symphony of **Mason** L. van Beethoven, with words from ‘Hymn to Joy’ by **Mason** Fr. von Schiller.

Between 1941 and 1944 a document was written – The Manifesto of Ventotene – in which European **unity** is proposed in the democratic spirit of those who had advocated it in the 19th century. The authors were Altiero Spinelli (a Freemason) **and** Ernesto Rossi.

28.10.1958 Angelo Roncalli, Freemason and Rosicrucian, was elected 261st Bishop of Rome and **Pope** of the Catholic Church. He had received his first Masonic initiation in 1940 in Istanbul, within the UrLodge “Ghedullah”, where study of the Kabbalah and of the Rosicrucian tradition was practised. Documents in the Lodge archive show Roncalli’s ascent via Companion of Art to Master Mason. They also record the presence of Catholic Mason and Knight of Malta Franz von Papen at the initiation ceremony in 1940. He had assisted **Hitler** in his appointment as Chancellor in January 1933, obtaining himself the post of vice-Chancellor. But in 1934 he wished to withdraw from the Nazi regime and was saved from assassination through the intervention of Hermann Göring. Roncalli underwent a **second** Masonic initiation, moving on to 4th degree of Legislating Master. In his internal Masonic communications he says that only a true Freemason and Rosicrucian can become a good priest, bishop etc. Together with von Papen he made great efforts to rescue Jews fleeing Nazi persecution.

The II Vatican Council, lasting from 1962-65, was a **historic** event for the Church.

An important mediator between the Pope and J. F. Kennedy was Freemason Cushing, archbishop of Boston and friend of the Kennedy family. Another important personality, able to mediate between Vatican, White House and Kremlin, was **Norman Cousins**, member of **at least five** Ur-Lodges. For his services, he was awarded with the Eleanor Roosevelt prize, the U. N. Peace Medal and the Albert Schweitzer Prize. A further factor in the success of the peace negotiations was the membership of N. Krushchev and of U. S. Diplomat L. Thompson Jr. In the Ur-Lodge “Golden Eurasia”. The leading role, however, was played by Pope John XXIII. After the death of J. F. Kennedy and the Pope in 1963, **both** were awarded posthumously the Presidential Medal of Freedom by Freemason Lyndon B. Johnson.

== some of the leading “Three Eyes” members . They include: David and Nelson Rockefeller, Gerald Ford, H. Kissinger, Z. Brzezinski, G. Agnelli, André Meyer, Joji Watanuki, R. Nozick, Raymond Barre, Edmond Adolphe de Rothschild, Samuel P. Huntington, John Connally, Henry Ford II, F. Von Hayek, Lee Kuan Yew, Milton Friedman, Tadashi Yamamoto, John McCloy, Henry Luce III, R. R. Bowie, Edward Heath, Armand Hammer, Georges Pompidou, V. Giscard d’Estaing, E. O.Reischauer (expert on Japan), J. R.

Schlesinger, R. Helms, J. J. Angleton, W. Mondale, Maurice Oldfield, Paul Marcinkus, Paul Volcker, Alan Greenspan, Zhou Enlai, Deng Xiaoping, Akio Morita, Masaru Ibuka, Kiichi Miyazawa, Yasuhiro Nakasone, Otto Graf Lambsdorff, G. H. W. Bush, Alexander M. Haig, R. (Dick) Cheney, W. E. Colby, Winston Lord, Henry Sturgis Morgan etc.

Nixon Government being represented by H. Kissinger, who wielded more influence than the Secretary of State. From 1971 onwards a new policy was pursued by Nixon and Kissinger, aimed at improving the relations between U.S.A. and China. This involved bringing top Chinese figures – Zhou Enlai (1971), Deng Xiaoping (1973) – into the Masonic fold.

“Three Eyes” Freemasons created a new para-Masonic association – The Trilateral Commission. It was to be more open to public life than other para-Masonic societies such as the Bohemian Club or Bilderberg Group, presenting itself officially as an organization that could connect N. America and Europe with Japan – creating a bridge between the three main industrialized areas of the world, all governed by free market principles and parliamentary democratic institutions. However, it became evident through the content of a study “The Crisis of Democracy. Report on the Governability of Democracies” that the **purpose** of the Trilateralists was to re- or de-structure Western democracies in an elitist, oligarchic, hierarchical direction. The study was presented as something new to

the Trilateral Commission meeting in Kyoto in May 1975, the main **signatories** being Michael Crozier, Samuel P. Huntington, Joji Watanuki (Freemasons). But it had in fact been worked upon from **1967** onwards in the secrecy of the “Three Eyes” Lodge, those involved being Z. Brzezinsky, R. R. Bowie, James Cornford, George S. Franklin, Gerard C. Smith, Tadashi Yamamoto, Yasumasa Tanaka, Erwin Scheuch, Karl Kaiser, S. M. Lipset, John Meisel.

Space programme of the Johnson administration, which culminated in the first Moon landing, on 21st July 1969, by **Neil Armstrong**, a Freemason of the “Three Eyes” **and also** of the “Janus” Lodge, of which Pres. Johnson was a member.

Freemasons who decided in 1967-68 to create the “Three Eyes” Lodge were aware of the motto of the ancient and accepted Scottish Rite: “Order from Chaos”. But their aim was to create a new order, so the question was how to create the chaos out of which the new order could be made to arise.

Greece was targeted, and a number of military figures were given Masonic initiations prior to the coup d'état of April 1967 which led to the **dictatorship of the “Colonels”**. But through the decades, beginning in the 50's, many nations had attempted to join together in a **nonaligned** movement independent of the two main

power blocs. **This** process had, however, been **closely** bound up with Masonic power struggles at the **highest** level. In Eastern Europe people were wishing, and demonstrating, for greater freedom. But in Poland this movement was crushed in March 1968. In Czechoslovakia there were many political figures belonging to the UrLodge “Golden Eurasia” who were trying to establish a “**Socialism with a human face**”. They were opposed by Masons of the reactionary “Joseph de Maistre” Lodge within the Czech Communist Party, who prompted Brezhnev (of the **same** Lodge) to send in hundreds of thousands of Soviet soldiers to put an end to the “**Prague Spring**”. Gustáv Husák, who was installed as leader, also joined the Ur-Lodge “Joseph de Maistre” and in 1983 was declared “**Hero** of the Soviet Union”. In China in the sixties the aim of **Mao’s** Great Cultural Revolution was to eliminate whatever appeared to cling to Chinese **tradition**, bourgeois values etc. This led to the death of hundreds of thousands (if not millions). Mao was able to demonstrate the art of creating chaos out of order and order out of chaos: a **subtle** art much needed for operations in the West, by neo-aristocrats such as H. Kissinger (who visited China in 1971 and brought Zhou Enlai into the “Three Eyes” Lodge).

The unseen work of the Freemasons extended through the 18th and 19th centuries and (leaving aside a first **experiment** in anti-democracy in the 1920’s and 30’s when they supported the Fascists and National

Socialists) changed radically towards the end of the 1960's. In contrast to the New Frontiers and **Great Society** policies proclaimed earlier, we **now** have a thrust towards the "**Small Society**" – thanks to the "Three Eyes" Lodge and its servant the Trilateral Commission. Their aim is **not** to make us all into mere "consumers, spectators, small investors", **but to create a privileged ruling class** (with varying levels, as in Orwell's 'Socing' -- Socing (Ingsoc in English) is the Neolinguia translation of "English socialism", the dominant ideology of the imaginary state of Oceania , one of the three countries in which the world is divided in the George Orwell novel 1984 . Those who adhere to the Socing doctrine must believe without reservation of three slogans : war is peace, freedom is slavery, ignorance is strength .) , **free to exploit with impunity** a globalized neo-proletariat.

In the case of the founding of both the Anglo-American Pilgrims Society and of the "Leviathan" Lodge, the two powerful Masonic bodies behind this ecumenical initiative were the democratic-progressive Ur-Lodge "Thomas Paine" (founded in 1849-52 **and** the expanded and re-founded in 1864-68) and the oligarchic-conservative Ur-Lodge "Edmund Burke" (founded in 1888). Let us recall here that the **first** to conceive and establish the supra-national "Thomas Paine" were a number of aproned personalities gathered around Masons of the calibre of John Stuart Mill, Giuseppe Mazzini, Alexander Herzen, Ferdinand Lasalle, Jules

Michelet, Louis Blanc, Giuseppe Garibaldi, Lajos Kossuth, John Bright, Richard Cobden, William E. Gladstone..... In the course of time, some members of the most radical left wing in the “Thomas Paine” also called into being the para-Masonic **Fabian** Society, founded in London on 4th January 1884. Amongst the most eminent Freemasons (belonging also to the “Thomas Paine”) who conceived and founded this para-Masonic body and were connected with it from the beginning, assuming full control, we would recall Freemasons Edward Carpenter, Frank Podmore. Henry Havelock **Ellis**, Martha Beatrice Webb, Sidney James Webb, Herbert George Wells, George Bernard Shaw, Annie Besant – who was to become an important exponent of the Masonic Order of Droit Humain **and** of the para-Masonic Theosophical Society – Virginia Woolf, Leonard Woolf, Emmeline Pankhurst. Still at the initiative of a number of “Thomas Paine” Freemasons, also involved in the para-Masonic Fabian Society, the London School of Economics and Political Science was founded in 1895. Following generations of Freemasons who were also active as Fabians included personalities of the calibre of James Ramsay MacDonald, Harold Joseph Laski, Jawaharlal **Nehru**, collaborator and disciple of Brother **Gandhi**, also connected to the Ur-Lodge – “Arjuna Phoenix”. As for the “Edmund Burke” , it was founded later than the “Thomas Paine” and with an opposite ideological direction.

The super-Lodge dedicated to the counter-revolutionary and anti-democratic Burke was founded in 1888 largely under the inspiration of a neo-aristocratic Mason of the calibre of Cecil Rhodes. Between 1888 and 1909 also founded at **Rhodes'** initiative were the para-Masonic associations Society of the Elect **and** Round Table Movement (the former being **secret**, like the Ur-Lodge that had founded it, **while** the latter was open and official) . Among the principal members of this oligarchic super-Lodge we could name personalities such as Nathan M. **Rothschild**, Alfred **Beit**, Alfred Milner, Reginald B. Brett, Arthur J. Balfour, Henry E. Manning, Albert H. G. Grey, Joseph Chamberlain, R. Gascoyne-Cecil, better known as the Marquess of Sailsbury, William W. Astor, John J. Astor IV, William H. Taft, Warren G. Harding, Louis Renault, Armand Peugeot.... The Ur-Lodge "Leviathan", therefore, offspring (b.1910) of a Masonic experiment for reconciliation of ideologically opposed super-Lodges, founded in July 1920 the para-Masonic British (**later** Royal) Institute of International Affairs, also known as Chatham House. On July 29th 1921 its counterpart in the U.S.A. , the paraMasonic Council of Foreign Relations was founded, whereby the "Leviathan" has since that time exercised a controlling influence on both the RIIA and the CFR.... Sagely inspired by Sister Thatcher and Brother Whitelaw, Masons Peter G. Peterson, Madeleine Albright, Marie Jana Korbel (pupil and protégé of Brzezinski), Colin Powell, **Muhammad Yunus**, Robert Rubin, Halil Ozal, Adolfo Gonzales,

José Maria Aznar, Anders Rasmussen, John Major, David M. Rubinstein, John Alan Redwood, Norman Lamont and others.

Licio Gelli and the “P2” Lodge. Gelli turned his attention elsewhere. He became Maestro Venerabile of the P2 Lodge, promoted Trilateral Commission-inspired **texts** on political change, **founded** the ‘World Organization of Masonic Thought and Assistance’, recruited to his two organizations people of prominence, particularly in S. America. In Argentina his influence and that of his associates grew, extending into the period of dictatorship under Videla.

United Freemasons – Towards a New World Order In late June - early July of 1981 a diplomatic committee presented to the attention of leading members of the Masonic progressive camp a project called ‘United Freemasons for Globalization’. The committee consisted of: Z. Brzezinski, Lew Wasserman, Madeleine Albright, Robert Rubin, Jacques Chirac. The progressives included: A. Schlesinger Jr., John K. Galbraith, François Mitterand, Helmut Schmidt, Jacques Delors, John Rawls, Olof Palme, Yitzhak Rabin, Ted Kennedy .

The war in Afghanistan (1979-89) was exploited for this purpose. Mujahidin leaders and prominent jihadists were initiated into Ur-Lodges; also Osama bin **Laden**, initiated by the hand of brother **Brzezinski** in person. In

Russia the ascent to power of M. Gorbachev was assisted by Y. Andropov **and** Armand Hammer. Boris Yeltsin, a faithful servant of the “Lux ad Orientem” (**founded** by Brzezinski in 1967), which had been given the task of introducing the ‘Washington Consensus’ into post-Soviet Russia. This led to the application of so-called ‘shock therapy’ in Russia: total liberalization, privatizations etc. as recommended by J. D. Sachs (Harvard Economist) and the U.S. Department of State controlled by neo-aristocratic Masons James A. Baker and Lawrence Eagleburger, with devastating effect on Russian society.

Yitzhak Rabin (Ur-Lodge “Daath”), Yasser Arafat (Ur-Lodge “Amun”).

This means that a spiritually qualified, initiated, élite must guide humanity, but that the outer forms of democracy must be preserved. Quote: “The majority of the too-many-billions of individuals inhabiting this planet, also in the West, live an animalic, anonymous and meaningless existence. It is important that these semi-bestial creatures should be guided by sane minds and energetic hands – even if 20 these often need to remain **invisible**, leaving the ‘front office’ to politicians acting as scarecrows and lightningrods. All this must happen according to very precise rules....

In 1993, the first year of Clinton's presidency, Dick Cheney and Don Rumsfeld commissioned Samuel Huntington to write 'The Clash of Civilizations', which then appeared and was disseminated widely in the critical year 1996 when Bush Sr. was seething with anger at the thwarting of his ambitions. Huntington's book was the ideological manifesto of **Freemasonry** for the 21st Century. It was the focus for the informal founding of the new Ur-Lodge "Hathor Pentalpha" under the auspices of Bush Sr., Jeb Bush, S.

Huntington, D. and R. Kagan, D. Feith, Dick Cheney, D. Rumsfeld, I. and W. Kristol, Dan Quayle, P.

Wolfowitz, R. Perle, Karl Rove etc. The next step was the forming of the **para**-Masonic think-tank "Project for the New American Century" in early 1997.

In 1997 Tony Blair had become P.M. in Britain and was inducted into the informal nucleus of the projected "Hathor Pentalpha" Lodge which, after a 4-year **secret** existence, became official in summer 2000. Its Grand Master was Dick Cheney, First Overseer Don Rumsfeld, Second overseer Bill Kristol, Orator Sam Huntington, Treasurer Paul Wolfowitz, Secretary Richard Perle, Deputy First Overseer Tony Blair, Deputy Orator Karl Rove, plus many others in the centres in Europe and the Middle East. The **first** really alarming act of the "Hathor Pentalpha" was the publication in Sept. 2000 of "Rebuilding America's Defences: Strategies, Forces and Resources for a New Century".

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The encounter between two fundamentally different approaches in seminal research in molecular biology--the problems, aims, methods and **metaphysics**--is delineated and analyzed. They are exemplified by the microbiologist Oswald T. Avery who, in line with the reductionist mechanistic metaphysics of Jacques Loeb, attempted to explain basic life phenomena through chemistry; and the **theoretical** physicist **Max Delbrück** who, **influenced by** Bohr's antimechanistic views, preferred to explain these phenomena without chemistry. Avery's and Delbrück's most important studies took place concurrently. Thus analysis of their contrasting approaches lends itself to examination of the Weltanschauungen view concerning the role of fundamental (metaphysical) assumptions in scientific change, that is, the view that empirical research cannot be neutral in regard to the worldviews of the researchers. This study shows that the initial ostensible disparity (non-integratibility) of the two approaches lasted for just a short time. Ironically it was a **student of Delbrück's school**, James Watson, who (with Crick) proposed a chemical model, the DNA double helix, as a solution to Delbrück's **problem**. The structure of DNA has not been seriously challenged over the past half century. Moreover, Watson's and Crick's work did not call into question the validity of Delbrück's research, but opened it up to entirely new approaches. The case of Avery and Delbrück demonstrates that after initial obstacles were overcome the different fundamental

attitudes and the resulting research practices were capable of integration.

Different Methods and **Metaphysics** in Early Molecular Genetics – A Case of Disparity of Research? Ute Deichmann Jacques Loeb Centre for the History and Philosophy of the Life Sciences Ben-Gurion University of the Negev P.O. B. 653 Beer-Sheva 84105, Israel and Department of Genetics University of Cologne Zùlpicher Str. 47 50674 Köln, Germany Abstract – The encounter between two fundamentally different approaches in seminal research in molecular biology – the problems, aims, methods and metaphysics – is delineated and analyzed. They are exemplified by the microbiologist Oswald T. Avery who, in line with the reductionist mechanistic metaphysics of Jacques Loeb, attempted to explain basic life phenomena through chemistry; and the theoretical physicist Max Delbrück who, influenced by Bohr's antimechanistic views, preferred to explain these phenomena without chemistry. Avery's and Delbrück's most important studies took place concurrently. Thus analysis of their contrasting approaches lends itself to examination of the Weltanschauungen view concerning the role of fundamental (metaphysical) assumptions in scientific change, that is, the view that empirical research cannot be neutral in regard to the worldviews of the researchers. This study shows that the initial ostensible disparity (non-integratibility) of the two approaches lasted for just a short time. Ironically it was a student of

Delbrück's school, James Watson, who (with Crick) proposed a chemical model, the DNA double helix, as a solution to Delbrück's problem. The structure of DNA has not been seriously challenged over the past half century. Moreover, Watson's and Crick's work did not call into question the validity of Delbrück's research, but opened it up to entirely new approaches. The case of Avery and Delbrück demonstrates that after initial obstacles were overcome the different fundamental attitudes and the resulting research practices were capable of integration.

It is generally accepted that metaphysical views – views about the fundamental nature of reality and the way to understand it – played a critical role in the development of science in the early modern period (see for example Seager 2000).¹ Subsequently the influence of philosophy (and religion) on modern science drastically receded, though some historians and philosophers argue that it has not disappeared.² The determining impact of metaphysics on modern science has been most clearly delineated by Paul Feyerabend and Thomas S. Kuhn, who claim the incommensurability of theories which are based on fundamentally different worldviews. "Practicing in different worlds," said Kuhn, "the two groups of scientists see different things when they look from the same point in the same direction" (Kuhn 1962, 149). And, "just because it is a transition between incommensurables, the transition between competing paradigms cannot be made a step at a time, forced by

logic and neutral experience. Like the gestalt switch, it must occur all at once (though not necessarily in an instant) or not at all” (Kuhn 1962, 149). Among Kuhn’s examples is the transition from the phlogiston theory to the oxygen theory of combustion as a significant step in the so-called chemical revolution. Max Planck’s famous dictum in his scientific autobiography of 1949 (Planck 1990, 15) – what David Hull et al. (1978) called “Planck’s principle” – that major new scientific ideas do not convince their opponents but flourish only after the deaths of their opponents, when they are adopted naturally by a new generation that has grown up with them, results in the very same as Kuhn’s theory (though with a different explanation). In the following, I explore the encounter between two fundamentally different approaches in seminal molecular biological research. They are exemplified by the discovery that DNA alone was the chemical basis of a genetic phenomenon by the microbiologist Oswald T. Avery and the founding of genetic phage research by **theoretical** physicist Max Delbrück, both taking place in the early 1940s. Avery’s and Delbrück’s re1 Prominent examples are Descartes, whose basic concepts, such as the “clear and distinct” cognition that led to certain scientific models of reasoning, were grounded in his metaphysics, and Galileo, whose seminal work in physics was grounded in his mathematical philosophy of nature, based on Plato and Archimedes, that is on the claim that mathematics possesses a superior value in the study of nature (Koyré 1968, 14f.). 2 Among commentators who

put forward theses not only on metaphysical, but also on psychological and sociological, influences on the scientific process are: Gerald Holton (1988) who holds that the commitment to themata such as reductionism and holism, simplicity and complexity, or mathematical and materialistic models, play a dominant role in the initiation and acceptance or rejection of key scientific insights; Paul Forman (1971), who, following Max Jammer, claimed that the predominantly irrational *Weltanschauung* prevalent in Weimar Germany prompted German physicists to search for and then accept an acausal quantum theory; and Ludwik Fleck, according to whom different disciplines and groups within disciplines distinguish themselves by disparate “styles of thought.” Evelyn Fox Keller (2002, 95-97) holds a “clash of cultures” responsible for the lack of appreciation of some theoretical models in mathematical biology by experimental biologists.

Methods and Metaphysics in Early Molecular Genetics
 55 search laid the crucial foundations for what was later called molecular genetics. However, this was not their intended purposes. Avery had set out to find a molecular solution for a problem in microbiology but at first not within the framework of genetics. Delbrück wished to solve the problem of gene replication as a fundamental problem of life but did not anticipate, or wish, the solution to be molecular. Whereas Avery’s approach was reductionist in the sense that he thought that life processes can be explained on the molecular level, Delbrück rejected reductionism; he hoped to find

new laws of biology that would account for fundamental phenomena of life. The different approaches of Avery and Delbrück and their encounter are analyzed in order to examine the view that empirical research cannot be neutral in regard to the worldviews of the researchers (Weltanschauungen). The analysis shows that differing fundamental (metaphysical) views were important for some time but did not lead to a lasting disparity of research. On the contrary, the change of attitude of one of the protagonists – in this case of Delbrück – contributed to a rapid scientific change.

Oswald T. Avery
 Avery's Research on Immunity and Transformation
 Born in Halifax, Nova Scotia, in 1877, the son of a clergyman, Avery received his M.D. from the College of Physicians and Surgeons of Columbia University in 1904. After practicing clinical medicine, in 1907 he began research on questions of immunity at the Hoagland Institute, Brooklyn. In 1913 he accepted an invitation from the director of the Hospital of the **Rockefeller** Institute for Medical Research in New York, Dr. Rufus Cole, to participate in studies on pneumococcus and its relationship to lobar pneumonia. He soon became a member of this institute where he continued his research until his retirement in 1948. Avery did not belong to the "club" of those geneticists, biochemists, or biophysicists, for example George Beadle, Max Delbrück, Torbjörn Caspersson, and Alfred Mirsky, who had set out to tackle questions of genetics on the level of biochemistry or physics. His main work was in

bacteriology and immunology and he always considered himself a microbiologist. Apart from transformation, the hereditary change of bacteria by isolated DNA (see below), he is remembered mostly for his work in immunochemistry, a new field that he helped create. In his work on the molecular basis of immunological specificity in the 1920s Avery, together with Michael Heidelberger, clashed for the first time with the generally accepted view that only proteins are complex and variable enough to account for biological specificity: They showed that at least some substances related to specific serological types of pneumococcus were, surprisingly, not proteins but carbohydrates (polysaccharides; McCarty 1985, 105). Avery became best known for his work on transformation of pneumococcal types, in the course of which he was the first to relate a phenomenon of heredity to DNA (up to that time genes were thought to consist of proteins), a crucial experiment for the examination of genes on the molecular level. The transformation of these bacteria was discovered by the physician Fred Griffith in London in the 1920s (McCarty 1985, chapter 4). Pneumococcus could exist in either encapsulated S forms or R forms, which both lost their capsules. The surfaces of non-virulent colonies (R) appeared rough under the microscope, while those of the colonies of virulent strains (S) were smooth. In 1928 Griffith published the results of *in vivo* experiments which showed that mice infected with a mixture of heat-killed deadly S form and harmless R

pneumococcus died: R form pneumococcus had been transformed to S form pneumococcus. Griffith, primarily interested in the implications of these experiments for the epidemiology and disease patterns of pneumonia, considered as possible mechanisms a stimulus provided by the dead S strains and a Lamarckian way of transmitting new characters. Avery at first met Griffith's report with much disbelief and skepticism, a reaction that was understandable in someone, as Avery's collaborator René Dubos put it, "who had devoted so much effort and skill to the doctrine of immunological specificity" (Dubos 1956, 36-48). Nevertheless Avery encouraged several of his co-workers to undertake research on transformation. After some time he accepted the validity of the claim for transmissible changes of immunological specificity and recognized the phenomenon's major importance. Five papers on transformation were published from Avery's laboratory by 1933, before, for various reasons, this work was temporarily stopped. In 1940, Avery resumed work on transformation together with Colin MacLeod and two years later with Maclyn McCarty. This time genetics, in particular mutation research, had become a major part of his research program. From 1930 to 1948 he read and commented on the claims and beliefs of leading geneticists and biologists about transformation.³ In 1944, Avery, MacLeod, and McCarty published their results on transformation in the conservative *Journal of Experimental Medicine* (Avery 3 Dubos (1975, 152). In 1954, Avery turned his notes

over to his last collaborator, Rollin Hotchkiss. They recorded the reactions to Griffith's and his own paper. Methods and **Metaphysics** in Early Molecular Genetics 57 et al. 1944). They showed that the factors underlying the property of serospecific polysaccharide capsules can be transferred from one colony of bacteria to another by cell-free extracts and that the transformed cells transmit their new phenotype to succeeding generations. They demonstrated clearly that what would later be called bacterial genes consist of DNA and DNA alone, to the exclusion of proteins and other macromolecules. In order to avoid speculation, they did not use the term gene but simply wrote that DNA is the fundamental unit of the transforming principle of *Pneumococcus* Type III. Avery's well-known letter to his brother Roy, a biochemist at Vanderbilt University, in 1943 made the genetic aspect of his framework more specific: By means of a known chemical substance it is possible to induce predictable and hereditary changes in cells. This is something that has long been the dream of geneticists Nucleic acids are not only merely structurally important but functionally active substances in determining the biochemical activities and specific characteristics of cells, ... sounds like a virus – may be a gene.⁴ As in other cases of unexpected discoveries, it took scientists some time fully to understand the meaning and far reaching implications of Avery's experiment (Deichmann 2004). But Avery's paper was immediately widely discussed and frequently cited and some scientists perceived its immediate significance for

the study of the chemistry of genes, most prominently Sir Henry Dale, Hermann J. Muller, and Sewall Wright. According to Muller, then the most renowned geneticist (see below), the “finding [of Avery and coworkers] is revolutionary,” if their conclusion about the role of DNA were to become accepted (Muller 1947). For several reasons, discussed elsewhere (Deichmann 2004), the period in which appreciation prevailed was followed by one of growing skepticism and neglect. This, however, would give way to a general acceptance and understanding of Avery’s results. The paper motivated new research on transformation, the chemistry of DNA, and bacterial genetics. The chemical basis of DNA’s biological specificity, which Avery could not yet answer, was successfully demonstrated first by Rollin Hotchkiss and then by Erwin Chargaff. By the end of the 1940s, Chargaff refuted the widespread assumption that DNA was a monotonous molecule by demonstrating the species-specificity of DNA’s composition and formulating his well-known rules of the base ratios in DNA (A/T and $G/C = 1$). Avery’s experiment also played an important role in motivating Maurice Wilkins at King’s College to continue 4 17 May 1943, The Oswald Avery collection, <http://profiles.nlm.nih.gov/CC/58> ute deichmann X-ray studies on DNA despite opposition from the Medical Research Council which wanted him to study the structure of cells rather than that of molecules (Wilkins 1995, 200-204). Wilkins succeeded to stimulate James Watson’s interest in this work on DNA and Watson, in

turn, motivated Francis Crick, who was carrying out X-ray research on proteins for his Ph.D. dissertation, to shift his interest from proteins to DNA. After some years, Avery's discovery became generally accepted and transformed genetics drastically, as indicated by Joshua Lederberg's paper half a century later: "The Transformation of Genetics by DNA: An Anniversary Celebration of Avery, MacLeod and McCarty (1944)" (Lederberg 1994). Avery's paper contradicted the generally accepted views that the carriers of biological, including genetic, specificity must be proteins and, in addition, that bacteria are unable to undergo stable and predictable hereditary changes. The 1944 paper marks the beginning of a new phase in the emerging molecular genetics in which the emphasis on biochemical methods and DNA replaced the emphasis on physical methods (in particular radiation studies) and proteins.

Avery's Research Practices and Metaphysical Assumptions

Avery's far reaching results and the revolutionary nature of his discovery stood in stark contrast to his conventional research practices, his cautious way of formulating his results, and his personal great modesty (Deichmann 2008; see also Charpa and Deichmann 2007). Generally, he refrained from announcing grand speculative theories. He also shunned philosophical discussions about science in spite of having received extensive philosophical training (Dubos 1976, 168-173). He used scientific concepts only in those domains that could be converted into experimental practice. Thus he never discussed general questions such as the nature

of the universe, of life, or of free will, unless they could be converted into questions that were amenable to experimental tests. To him scientists could not sensibly discuss the nature of life, but they could examine the mechanisms of life processes, such as growth and self-reproduction. Notwithstanding the fact that he avoided theoretical discussions about the scientific method – an attitude that he shared with many empirical scientists – a careful choice of problems, appropriate methods, and their optimization, played a decisive role in his work, in which he tried throughout his life to find experimentally simple causes for apparently complex phenomena.

Avery's approach belonged to the mechanistic tradition prevalent Methods and Metaphysics in Early Molecular Genetics 59 at the Rockefeller Institute, that is, to search for chemical or molecular explanations of life phenomena; a tradition which had a long history in microbiology, for example in nineteenth-century France. In regard to the focus on basic research and on biochemical and physicochemical methods at the Rockefeller Institute, the influence of Jacques Loeb, a German-Jewish biochemist and biophysicist, who became a member in 1910, was of special importance. Loeb formulated the goal of a reductionist mechanistic science most clearly: "According to mechanistic science, it should be in the distant future possible to reduce these specific life phenomena to the ultimate elements of all phenomena in nature, that is, motions of electrons, atoms, or molecules" (Loeb 1915, 772).

Avery was convinced that biological phenomena are

only complex expressions of physicochemical processes and that physics and chemistry offer the only pathways leading to a real understanding of the phenomena of life. He made it his scientific ideal to formulate pathological and biological problems in physicochemical terms and to define chemically the substances and reactions involved. The following paragraph from the summary of Avery et al.'s paper (1944) indicates the variety of mainly chemical and biochemical methods that he used as well as the caution expressed in his formulations: The data obtained by chemical, enzymatic, and serological analyses together with the results of preliminary studies by electrophoresis, ultracentrifugation, and ultraviolet spectroscopy indicate that, within the limits of the methods, the active fraction contains no demonstrable protein, unbound lipid, or serologically reactive polysaccharide and consists principally, if not solely, of a highly polymerized, viscous form of desoxyribonucleic acid. Loeb's mechanistic approach had an enormous influence on a generation of young medical and biological scientists in the United States, among them Thomas Hunt Morgan and Hermann Muller (Allen 1978; Ravin 1985; Pauly 1987). Loeb propagated forcefully his view that life phenomena can be explained by chemical and physical methods, and was convinced that biologists had to use and develop these methods further if they wanted to work scientifically. Already in the 1910s, Loeb stimulated the earliest attempts to associate (but not equate) genes and

enzymes. Avery's special interest in examining biological, including genetic, specificity by chemical means went in the same direction. 60 ute deichmann

Max Delbrück⁵ From Physics to Biology - Motives and Metaphysical Assumptions Max Delbrück's motives and social attitudes were strongly shaped by his family. Born in 1906, he was the youngest of seven children of the prominent German historian Hans Delbrück. The Delbrücks were a well-known German family that included renowned professors and Prussian politicians. Max's uncle, Adolf von Harnack, was a Protestant theologian and first president of the Kaiser Wilhelm Society and his great-grandfather was Justus von Liebig. Max Delbrück enjoyed family life and the frequent gatherings of family and friends at home, meetings that were characterized by a constant exchange of ideas. Later on he would extend this attitude to colleagues and students. Professionally he searched for a niche, an area that none of his family knew much about, such as the sciences. With Kepler as his romantic hero, Delbrück decided to study astronomy in Berlin. He changed to physics shortly after, which he studied in Göttingen, receiving his Ph.D. in theoretical physics with Max Born in 1929.⁶ The three postdoctoral years (1929-1932) in England, Switzerland, and Denmark, in particular the association with Wolfgang Pauli in Switzerland and Niels Bohr in Denmark, had a profound influence on his later work and career. For positive as well as negative reasons he began to consider leaving physics for biology. The

winter which he spent with Pauli in Zürich, rewarding as it was personally, also revealed his limitations in mathematics. The Russian-American physicist George Gamow, a friend of Delbrück's, recalled that Delbrück had been scolded for some of his ideas by Pauli and probably began to realize that physics was too complicated for him and that he could never match colleagues such as Weisskopf and Pauli. This experience may have accelerated Delbrück's move to biology a few years later (Fischer and Lipson 1988, 60). According to his own account, Delbrück became attracted to biology by the lecture "Light and Life" given by Niels Bohr in Copenhagen in 1932 and by Bohr's extension of the concept of complementarity to biology (Delbrück [1949] 1966).⁷ Bohr proposed that life might not be reducible to atomic physics. He speculated that the complementarity argument of quantum mechanics – the fact that an electron can either

5 For Delbrück's biography, context and details of phage research, see Olby (1974), Fischer, Lipson (1988), Kay (1985), and Morange (1998). 6 For details see Born's recollections (Born 1975, 312). Born considered Delbrück as one of his best students. 7 Bohr's lecture was published in *Nature* (1933) 131: 421-423, 457-459. *Methods and Metaphysics in Early Molecular Genetics* 61 behave as a particle or as a wave – might be applied to the explanation of phenomena of life. The laws of biology, said Bohr, might be complementary to those of physics and chemistry in a similar way as the "spatial continuity of light

propagation” according to electromagnetic theory was complementary to the “atomicity of the light effects,” the light quanta. Both features were aspects of one reality, the phenomenon of light, and could not contradict each other because a closer analysis of each aspect would demand “mutually exclusive experimental arrangements.” Bohr regarded the existence of life as an “elementary fact that cannot be explained, but must be taken as a starting point in biology” and he concluded with the notion that “the asserted impossibility of a physical or chemical explanation of the function peculiar to life” would be “analogous to the insufficiency of the classical mechanical analysis for the understanding of the stability of atoms” (Delbrück [1949] 1966). Bohr used but did not define complementarity. Many of his colleagues found the concept trivial at best or simply unnecessary. Among the strongest critics was Einstein, who rejected it because a definition was impossible (Fischer and Lipson 1988, 78). After a discussion with Bohr, Hermann Muller considered Bohr’s ideas about biology hopelessly vitalistic (Fischer and Lipson 1988, 88).⁸ Vitalistic or not, Bohr’s notion of biology stood in stark contrast to the reductionist mechanistic approach, as outlined in the foregoing. Delbrück’s fascination with the idea of complementarity reflected his anti-mechanistic attitude, as was then common among theoretical physicists in Weimar Germany (Forman 1971), with Bohr and Heisenberg as his absolute scientific authorities (Delbrück [1949] 1966, 19). In

1944, the same year that Avery and coworkers published their paper on transformation, Delbrück made it clear that he considered it outdated that scientists still adhered to the old mechanistic view of Helmholtz and believed that basic life processes were merely of a chemical nature.⁹ As he pointed out a few years later, he was convinced that Helmholtz's mechanical view, according to which the behavior of living cells should be accountable in terms of motions of molecules acting under fixed force laws, would never work; it would be impossible to gain sufficient knowledge of all chemical data in order to make quantum mechanical calculations of the development of the cell (Delbrück [1949] 1966, 16-20). He likewise rejected approaches of biochemists – quoting Jacques Loeb as 8 Vitalists consider organisms fundamentally different from non-living entities because they contain non-physical elements or are governed by different principles than are inanimate things. ⁹ Delbrück, “Problems of Modern Biology in Relation to Atomic Physics”, lecture April 1944 at Vanderbilt University School of Medicine (Delbrück papers, Caltech Archives). 62 ute deichmann representative of this attitude – to reduce phenomena of life to mechanical problems of groupings and displacements of ultimate particles and claiming that there was no discontinuity between the matter that constituted the living and the non-living world (Delbrück [1949] 1966, 16-20). Delbrück, who had no training in biochemistry or chemistry, disliked what he thought biochemistry was all about (the cell is “a sack

full of enzymes acting on substrates ... they must be synthesized and must be brought into a position by maneuvers which are not yet understood”). To him, the biochemical “program of explaining the simple through the complex smacks suspiciously of the program of explaining atoms in terms of complex mechanical models. It looks sane until the paradoxes crop up and come into sharper focus” (Delbrück [1949] 1966, 22). Delbrück’s speculation about the application of Bohr’s complementarity principle to biology expresses his anti-reductionist stand most clearly: certain features of the living cell including replication may stand in a mutually exclusive relationship to the strict application of quantum mechanics, and . . . a new conceptual language has to be developed to embrace the situation. The limitation in the application of present day physics may then prove to be, not the dead end of our search, but the open door to the admission of fresh views of the matter. Just as we find features of the atom, its stability, for instance, which are not reducible to mechanics, we may find features of the living cell which are not reducible to atomic physics but whose appearance stands in a complementary relationship to those of atomic physics. (Delbrück [1949] 1966, 20-21) He believed that paradoxes would turn up in biology after the analysis of the behavior of living cells had been carried out in far greater detail and, with the help of physicists, theories would be formulated without fear of contradicting molecular physics (Delbrück [1949] 1966, 22). Wolfgang Pauli later pointed to a psychological basis

for Delbrück's predilection for the complementarity principle: Max's "emotional" interest in complementarity arose from the fact that he "shuddered at the thought that life is 'nothing but a complicated wave function.'" ¹⁰ Whatever was behind Delbrück's special liking for complementarity, his metaphysics and methods were the opposite of those of Avery. Gunther S. Stent, a student of Delbrück's, even claimed that Delbrück's metaphysics had given rise to a new kind of biological science: Through Delbrück, Bohr's epistemology became the intellectual infrastructure of molecular biology, the reason, perhaps, for his hegemony over twentieth-century life sciences. It provided for molecular biologists the philosophical guidance ¹⁰ Pauli to Weisskopf, 1958 (Fischer and Lipson 1988, 222). *Methods and Metaphysics in Early Molecular Genetics* 63 for navigating between the Scylla of crude biochemical reductionism, and the Charybdis of obscurantist vitalism, inspired by nineteenth-century romanticism. (Stent 1986, 2)

However, as will be shown below, this quotation reflects Stent's own wishful thinking, not the reality of the development of molecular biology. *Delbrück's Turn to Genetics* As indicated in the foregoing, there was not only a metaphysical but also a methodological reason for Delbrück's attraction to the concept of complementarity. He thought that it could reveal great simplicity in a very complex situation. The search for paradoxes in biology, to which Bohr's complementarity principle could be applied, implied a search for the

smallest units to study life processes, namely atoms of biology, that is basic units with clear-cut properties, the analysis of which did not require the complicated biochemistry of metabolism. In contrast to the purely speculative engagement with biology by Bohr, Schrödinger, and Pascual Jordan,¹¹ Delbrück aimed at and succeeded in developing new methods and devising novel experiments. His search for a biological problem that might serve his purposes finally brought him to genetics, in particular radiation genetics, then one of the fastest growing and most promising biological subdisciplines. Delbrück's choice of genetics was due to institutional, intellectual, and personal reasons. On his return to Germany in 1932, he accepted the post of assistant to Lise Meitner at the Kaiser Wilhelm Institute (KWI) for Chemistry in Berlin, because, among other reasons, of the vicinity of this institute to other KWIs, in particular the KWI for Brain Research. Here Nikolai Timoféeff-Ressovsky was heading a department for genetics which pioneered evolutionary and radiation genetic research in Germany; Delbrück was a frequent visitor. Radiation genetics had become very fashionable after Hermann Muller in 1927 in an elegant experiment induced artificial mutations by X-rays. Muller also contributed largely to the elevation of the gene as responsible for only marginal features, such as eye or flower color, to the gene as the "basis of life" (Muller 1926). He happened to be at Timoféeff's ¹¹ For the motivation and actual roles of Bohr, Schrödinger, and other physicists in biology from the 1930s to the 1960s

see Olby 1974, 225-247, and Morange 1998, 67-78; for Jordan, see Deichmann 1996, 212, 214-215, and references. Evelyn Fox Keller (2002, 82-89) points to the failed early attempts by theoretical physicist Nicolas Rashevsky to mathematically model basic biological processes and create a mathematical biology. 64 ute deichmann laboratory one day in 1932 when Delbrück returned to Berlin; Delbrück immediately became very impressed by Muller, later describing him as one of the few truly great living scientists.¹² Timoféeff, Delbrück, and some other physicists and biochemists, began to have regular scientific discussions at Delbrück's home. On Muller's suggestion, Timoféeff started to collaborate with the physicist Karl G. Zimmer to work on radiation genetics; Delbrück joined them some time later. The collaboration resulted in the publication of their well-known joint paper "Über die Natur der Genmutation und der Genstruktur" that consisted of three separate contributions and a joint conclusion by its authors (Timoféeff et al. 1935).¹³ Delbrück's contribution was a theoretical paper in which he developed a quantum physical model to explain properties of genes, in particular their stability and capability to mutate. Though he considered a gene as a "well-defined association of atoms," he did not attempt to explain gene stability chemically, for example by relating it to the stability of chemical bonds or a molecular configuration. Instead he suggested a physical model, assuming that this stability was caused by the strength of interatomic forces and gene mutation

by a quantum jump from one stable configuration to another through certain forms of energy from the outside. Muller was one of the few geneticists at the time who were enthusiastic about Delbrück's paper and its suggestion of collaboration between geneticists and physicists, that he had long advocated (Kay 1985, 221). Morgan and his colleagues at the California Institute of Technology were very interested, but found the physics and mathematics incomprehensible. Delbrück's paper became the basis for Schrödinger's gene concept in his 1944 *What is Life?* and was the motivation for a number of physicists to turn to genetics. It also earned Delbrück a fellowship from the Rockefeller Foundation; in 1937 he moved to the United States. (It was due to Delbrück's "misbehavior" at a Nazi training course for university teachers that he was not immediately accepted for Habilitation.) The American fellowship provided him with the opportunity to pursue his interest as a physicist in genetics. Delbrück's *Research in Phage Genetics* Once in the United States, Delbrück started to search for a suitable experimental object with which to study gene replication, which he considered the fundamental property of life. He undertook his first experimental work, on *Drosophila* cytogenetics, in the laboratory of Milislav Demerec at Cold Spring Harbor. He liked to experiment, but

considered the methods of *Drosophila* cytogenetics too complicated and the data unsuitable for rigorous analysis. His search for a suitable object was frustrated several times thereafter (Kay 1985; Summers 1993). His next attempt involved research on the tobacco mosaic virus (TMV) in the laboratory of Wendell Stanley. Two years earlier, in 1935, Delbrück had become fascinated with Stanley's discovery that TMV can be crystallized. Since viruses are able to replicate identically, Delbrück, following discussions with Muller in Copenhagen in 1935, found the idea that TMV might serve as model of the gene extremely attractive and thought that virus research might be relevant "for a general assessment of the phenomena peculiar to life" (Delbrück [1937] 1970). (Muller had envisaged this role for bacterial viruses, or phage, in 1922.) Delbrück even sensed that basic life phenomena might be simpler than anticipated by Bohr and challenged the idea of complementarity: "One should view replication not as complementary to atomic physics but as a particular trick of organic chemistry" (Delbrück [1937] 1970). However, in practice, TMV research turned out to be very complicated and time consuming and the results difficult to analyze quantitatively. Working afterwards in the laboratory of Thomas H. Morgan at the California Institute of Technology on problems of the chromosome theory in *Drosophila*, he became convinced that this approach, too, would not be helpful in the study of gene replication as a fundamental problem. This was despite

his admiration for the excellent quantitative work of this group (Delbrück 1935). But *Drosophila* genetics had become so specialized that Delbrück felt overwhelmed by the complexities of even this relatively well-defined field of research (Kay 1985, 221). According to Norman Horowitz (1998) Delbrück's lecture shortly after his arrival at Caltech in 1937 revealed experimental biologists' lack of understanding of Delbrück's simple models: "He began his talk by drawing a circle on the blackboard and saying, 'Let us imagine the cell as a homogeneous sphere.' The whole room burst into laughter."¹⁴ A similar citation of Horowitz is in Fischer and Lipson (1988, 112), who do not provide a source. There is a strikingly similar example of a failed dialogue between a physicist and biologist some years earlier, when, according to Fox Keller (2002, 82, 84), the theoretical physicist Nicolas Rashevsky, who worked on the physics of cell division and was ambitious to create "a systematic mathematical biology", presented "a preliminary version of his physico-mathematical analysis acting on an idealized (spherical) cell" to an audience of biologists at the Cold Spring Harbor Laboratory. His work was not appreciated. However, at Caltech Delbrück finally found what he had been looking for: a congenial experimental object, phage, with which he was able to achieve the fast and clear-cut results he had hoped for. The biochemist Emory Ellis, who conducted phage research, showed him the methods developed by Félix d'Hérelle to detect and count phage particles by

counting holes in a bacterial lawn. D'Hérelle in 1917 in France and Frederick W. Twort in 1915 in England were the first to describe phage as filterable entities capable of destroying bacterial cultures. Delbrück was immediately struck by the simplicity and elegance of this approach: I was absolutely overwhelmed that there were such very simple procedures with which you could visualize virus particles . . . you could put them on a plate with a lawn of bacteria, and the next morning every virus particle would have eaten a macroscopic one-millimeter hole in the lawn. You could hold up the plate and count the plaques. This seemed to me just beyond my wildest dreams of doing simple experiments on something like atoms in biology.¹⁵ He devoted all his efforts on phage research and decided not to return to physics, which he was on the verge of doing. He was very fortunate to receive the full support of Morgan who continued to host him and recommended him to the Rockefeller Foundation. Delbrück's and Ellis's work on the one-step growth of phage, in which they used the Poisson distribution to derive the numbers of phage in the initial suspension and showed that one particle was enough to destroy one bacterial cell, was the beginning of modern phage research; that is, quantitative research on the growth, replication, and mutation of phage as a distinct particle. They varied and strictly controlled initial and boundary conditions, e.g. dilutions, temperatures, and phage strains. The relations between the input (infecting phage) and output (newly replicated phage) could then be expressed in

mathematical equations; the assumption was that by inference the hidden mechanisms of replication would be revealed and biochemistry would become irrelevant in solving this problem (Kay 1985, 135). Because Delbrück used and supported d'Hérelle's concept of phage, he soon found himself involved in an ongoing dispute with biochemists. Whereas d'Hérelle and his school assumed that phage were particulate microbes - they had, however, not supported this view by rigorous statistical analysis (Summers 1999, 177-178)¹⁶ - a group of biochemists claimed that phage was not a particulate infectious agent but an inactive precursor produced by bacteria. Delbrück wanted to study phage replication in the black box of the host bacterium: thus the concept of autonomous exogenous phage was of crucial importance. His attempt to differentiate genetic from enzymatic behavior led to a debate over the origin of phage with the biochemists John Northrop and Alfred Krueger, who shared the widespread assumption that the "autocatalysis" of genes, enzymes, and viruses are related phenomena and claimed that phage was an autocatalytic enzyme produced from a precursor in the

bacterial cell (Creager 2001, 195-201). Delbrück not only used the concept of exogenous phage because it fitted his needs but he also provided clear experimental evidence for it: there was no sign of the existence of sigmoid phage growth curves that would have indicated autocatalytic growth (Morange 1998, 43). Phage needed bacteria only to replicate. However, Delbrück, even when there was clear-cut evidence that some phage showed deviating behavior, clung stubbornly to this concept of autonomous phage particles. Thus, he refused to accept observations by microbiologists of lysogenic phage, i.e. phage, which seemed to arise spontaneously from uninfected strains of bacteria because it can exist as a non-detectable prophage (that was later shown to consist of phage DNA). When after a short period of common research, Emory Ellis had to leave phage work in order to continue cancer research, Delbrück started collaboration with the Italian immigrant physiologist Salvador Luria and the bacteriologist Alfred Hershey, three scientists sometimes referred to as founders of the “phage group.” The intellectual, methodical, and stylistic novelty of Delbrück’s approach was clear to everyone in the field. Elie Wollman, an early phage researcher at the Institut Pasteur recalled (referring not to Descartes’ mechanistic view but to his rationality and “clear and distinct” principle): Taking a strictly Cartesian attitude, Delbrück and Luria had swept away the facts and interpretations accumulated by their predecessors over twenty years and started anew. Within a few years they, and the

small group of other workers they had attracted by the simplicity, the precision, and the elegance of their new departure, had made tremendous advances. (Wollman 1966, 216) According to Thomas F. Anderson, who took one of the first electron microscopic pictures of phage: The experiments [by Emory Ellis and Delbrück on growth of phage and by Delbrück on adsorption and one-step growth] were beautifully designed and reported in an elegant style that was new to me. The three papers carrying the Delbrück label formed a little green island of logic in the mud-flat of conflicting reports, groundless speculations, and heated but pointless polemics that surrounded the Twort-d'Herelle phenomenon. (Anderson 1966, 63) 68 ute deichmann Delbrück's aim was very clear. By studying phage replication he wanted to elucidate what he considered the most basic life phenomenon in the simplest possible experimental system, hoping to come across a paradox that would bring about the solution all at once and lead to new biological laws. Yet his most renowned single paper (with Luria), the so-called fluctuation experiment of 1943, dealt with an entirely different problem, namely bacterial adaptation. Luria and Delbrück showed quantitatively that adaptation of bacteria to virus infection by developing mechanisms of virus resistance was a Darwinian process, namely the result of random mutations occurring prior to contact with the virus and subsequent selection and not, as was widely believed, of directed mutations in a Lamarckian sense (Luria and Delbrück 1943). Because the paper allowed

the measurement of much lower mutation rates than was previously possible, the interest in mutation studies in bacteria grew rapidly. But unlike Luria, Delbrück was not very interested in this experiment, because he considered it a “side-issue which is threatening to displace the main issue, by virtue of its explosive content of possibilities for studying bacteria genetics” (Fischer and Lipson 1988, 147). The main issue was and remained phage replication. After some years Delbrück succeeded to establish phage research as a successful and novel research area in genetics; it became one of the main founding fields of molecular genetics. Despite the extensive usage of mathematics and the choice of phage as research object, a number of classical geneticists treated Delbrück’s work with great respect and some of their leaders, in particular Morgan and Muller, were highly appreciative. Leading physicists such as Bohr and Schrödinger also made Delbrück’s work known. By 1946 Delbrück had contributed greatly, most importantly by introducing the “phage courses,” to establish Cold Spring Harbor as a center for phage research; after he was appointed professor at the California Institute of Technology in 1947 phage research became a focus of research at this institution. This was despite the fact that Delbrück himself gradually began to investigate other areas of research. By the end of the 1940s he was working on the fungus *Phycomyces* which he hoped would serve as the atom of sensitivity and vision. He left phage research altogether a few years later. Comparison of

Avery's and Delbrück's Approaches; Delbrück's Reception of Avery's Paper Every comparison has to be based on commonalities and Avery's and Delbrück's work certainly displayed a number of common features. Their Methods and Metaphysics in Early Molecular Genetics 69 most influential work was in what was later called early molecular genetics, with their most influential publications appearing at about the same time (1943 and 1944). They brought together (Delbrück) or helped to do so (Avery) microbiology and genetics and contributed to the founding of bacterial genetics. In both cases, research led to major scientific changes in genetics and microbiology, opening up new lines of research. Finally, both put great emphasis on the exactness of experimentation. Yet, as the foregoing has shown, their basic approaches were entirely different. Avery, a representative of the mechanistic research tradition, believed that life phenomena could be understood only by physical and chemical means. He considered the determination of the chemical nature of biological specificity – immunological, genetic, or other – to be essential, and his main methods were chemical, enzymatic, and serological. His aim was to examine the mechanisms of life processes, such as immunology and heredity at the chemical (or molecular) level and not to speculate about the nature of life. Experimentation was central. Delbrück, in contrast, was strongly influenced by the anti-mechanistic traditions in theoretical physics. Rejecting the mechanistic research programs of Helmholtz and Loeb, he believed that basic life

processes cannot be explained by chemistry and considered the determination of the chemical nature of genes irrelevant. He was interested in a process, replication, not a substance.¹⁷ His goal was to find new, non-mechanistic universal laws in biology. As pointed out earlier, Delbrück, unlike other theoretical physicists in biology, conducted experiments. But his methods did not include chemistry; they were mainly genetic and statistical. Theory was central. These differences between Avery's and Delbrück's approaches provide a rationale for the neglect with which Delbrück responded to Avery's paper. He knew about Avery's results even before publication, because Avery's brother Roy was a colleague of Delbrück's at Vanderbilt University and showed Delbrück the 1943 letter of Avery. But, unlike prominent geneticists, such as Muller and Wright, the idea that genetic phenomena are related to a particular chemical substance did not mean anything to Delbrück and was not integratable into his approach. Delbrück responded accordingly: not only did he not take up Avery's results in his own research, but he never even cited the paper. In a conversation with Horace Freeland Judson, Delbrück recalled the fact that Avery's paper was just meaningless to him. "Even when people began to believe

¹⁷ It is perhaps pertinent to add that Delbrück was a convinced Darwinian (Luria and Delbrück 1943; Delbrück 1986), a fact that might have contributed to his strong interest in the problem of inexact replication, a central concept in Darwinian thought. ⁷⁰ ute

deichmann it might be DNA, that wasn't really so fundamentally a new story, because it just meant that genetic specificity was carried by some goddam other macromolecule, instead of proteins" (Judson 1979, 59-60). Delbrück's later attempt to explain his lack of interest in Avery's discovery by its logical (and "not psychological") prematurity,¹⁸ thus appears contradictory and with hindsight was an attempt rationally to explain his lack of interest in the chemical basis of the gene, even when DNA was shown to be of high variability and members of the phage group had confirmed Avery's results.¹⁹ René Dubos perceived also a social-psychological reason for Delbrück's neglect: "Certain members of the 'phage group' regarded the orthodox chemical approach to the understanding of biological phenomena as pedestrian, too slow, and not revolutionary enough for their intellectual ambition, . . . they did not seem able to do much with or build on [Avery's experiment]" (Dubos 1976, 158). To Delbrück, until the early 1950s chemical (molecular) approaches did not seem to be able in principle to explain phenomena peculiar to life such as gene replication. However, some years later there was a remarkable change of mind, Delbrück stated: "We now meanwhile know that living organisms despite their enormous complexity can be successfully regarded as molecular systems."²⁰ How was this possible? ¹⁸ Delbrück in 1972 wrote to Stent that he and others believed Avery but at first did not see how DNA could carry specificity; later, after Chargaff's and Hotchkiss's

findings, it was believed that DNA could carry specificity but Delbrück thought of that specificity as a tertiary structure, as in proteins, though conditioned as in proteins by sequences. [This is very doubtful because the connection between sequence and structure was not clear at all at the time, UD]. Even after Hershey-Chase, Delbrück said, DNA was just another macromolecule with an awfully complicated specific structure. Then a few months later “came the Watson-Crick denouement forcing one to accept a simple structure for DNA.”

Avery’s discovery was not much talked about because it was premature, logically premature, that is, not psychologically (Fischer and Lipson 1988, 152-3). This argument was repeated by Gunther Stent (1972) who generalized it to the effect that Avery’s discovery had virtually no effect on the discourse of genetics, because of its logical prematurity. The untenability of this argument has been analyzed in Deichmann (2004).

Among the many reasons for decline in interest for Avery’s discovery after initial appreciation was the irreproducibility of André Boivin’s experiments. He claimed to have reproduced Avery’s experiment in *E. coli*.¹⁹ In 1950, the biochemists Rollin Hotchkiss and Erwin Chargaff, after examining the composition of macromolecular DNA of different species, showed that the ratios of the four bases were different, i.e. that DNA was indeed able to carry biological specificity. In 1952, Hershey and Chase had confirmed Avery’s findings in phage though in a less clear-cut experiment (without citing Avery), showing that only phage DNA entered

bacteria and brought about replication. 20 Delbrück, “Eine Verschwörung der Natur”, written in the 1970s, published posthumously in Mannheimer Forum, 1985-86, 9-45: 45 [translation UD]. Methods and Metaphysics in Early Molecular Genetics 71 Delbrück’s Change of Mind and the Integration of Phage Genetics and Molecular Genetics The reason for Delbrück’s sudden shift of opinion can be found in a letter of James Watson from 12 March 1953. Watson was then a student member of the phage group; his recently completed Ph.D. dissertation had been supervised by Luria. Watson was very fond of Delbrück, who became his role model, as he recalled in several essays: His visit [in 1966 at Luria’s flat in Bloomington] excited me, for the prominent role of his ideas in *What is Life?* made him a legendary figure in my mind. My decision to work under Luria had, in fact, been made so quickly because I knew that he and Delbrück had done phage experiments together and were close friends. Almost from Delbrück’s first sentence, I knew I was not going to be disappointed. He did not beat around the bush and the intent of his words was always clear. But even more important to me was his youthful appearance and spirit. This surprised me, for without thinking I assumed that a German with his reputation must already be balding and overweight (Watson 1966, 241). My getting to know him during the summer of 1948 at Cold Spring Harbor was a revelation, with his tall youthful esprit soon becoming the model for what I wanted out of my life. How one gene becomes two identical genes was the

problem to solve. (Watson 1997, 217) Delbrück was instrumental in getting fellowship support for Watson so that he could remain at Cambridge. In the letter of 1953 mentioned above, Watson, writing from Cambridge, informed Delbrück about the unusual new model of DNA, which he and Crick had just developed: the double helix with two antiparallel strands kept together by two types of pairs of complementary bases. He announced the publication of this model shortly after (Watson 1953). If the model was correct, thought Watson, he suspected that it would help explain “the manner in which DNA can reproduce itself. For these reasons (in addition to many others) I prefer this type of model over Pauling’s, which, if true, would tell next to nothing about [the] manner of DNA reproduction” (Watson 1953). It was this letter with drawings of the pairing of these bases, adenine – thymine and guanine – cytosine, that caused Delbrück immediately to reconsider his basic assumptions about the problem of gene replication. In June 1953, he wrote to Carsten Bresch, an early phage researcher in Germany, that now all facts of genetics would have to be re-interpreted and, a little later, “it would be hardly believable that Nature would not have made use of the wonderful invention of the gentlemen Watson and Crick” (Bresch 2007, 42-43, translation UD). He noted the “WatsonCrick denouement forcing one to accept a simple structure for DNA” (Fischer and Lipson 1988, 152-153). 72 ute deichmann The “wonderful invention” was the simplicity, explanatory power, and fruitfulness of the

model. As Watson indicated in his letter and he and Crick pointed out in their 1953 paper, it suggested a simple mechanism as an answer to the basic question that Delbrück had set out to solve: gene replication. Delbrück immediately realized the implications. After receipt of Watson's letter, he wrote to Bohr: "Very remarkable things are happening in biology. I think that Jim Watson has made a discovery which may rival that of Rutherford in 1911."²¹ Delbrück also described his response to the double helix model in psychological terms: With the discovery of the double helix it became clear that behind the secret of gene replication there was hidden just a sophisticatedly simple trick. The double helix left behind ashamed (*düpiert*) all those who had assumed a profoundly deep solution behind the deep problem how in living nature the same is created from the same. They are facing the same fate as someone whom you explain the embarrassingly simple solution of a chess problem with which he had tormented himself for a long time.²² Delbrück realized that Watson (and Crick) had achieved the goal he had set out to solve. His decision to leave phage research and genetics shortly after and focus entirely on a completely different type of research in the fungus *Phycomyces* may have been a reaction to his failure to solve the problem of gene replication and thereby reveal new laws of biology. But he continued to be a close observer of and commentator on new developments in molecular biology and to teach and propagate molecular genetics, not only at Caltech but also in Germany, where he was

of crucial importance for the establishment of university institutes devoted to that field. In particular he became co-founder of the Institute for Genetics at the University of Cologne, where he was keen to also bring in a biochemist, Hans Zachau, to join the faculty (Wenkel and Deichmann 2007). Delbrück's acceptance that the basic problem he had tried to solve had become a molecular one did not change his hope that there might be paradoxes in biology that could lead to new, non-molecular, basic laws.²³ Yet, as he explained in a lecture in 1957, this hope did not ²¹ Delbrück to Bohr, 14 April 1953, Delbrück papers, Caltech. Delbrück's appreciation did not prevent him from being very critical of Watson shortly afterwards; among other things he thought that Watson was "ruthlessly egocentric in scientific matters," to the extent that he refused to support Watson with gaining funding (Berg, Singer 2003, 217-8). ²² Delbrück, "Eine Verschwörung der Natur", published posthumously in Mannheimer Forum 1985-86, 9-45: 44. ²³ Thus he wrote to Bohr in 1954 about his new work on *Phycomyces*: "What I failed to stress was my suspicion, you might say hope, that when this analysis is carried sufficiently far, it will run into a paradoxical situation analogous to that into which classical physics ran in its attempts to analyse atomic phenomena. This, of course, has been my ulterior motive in biology from the very beginning" (from Kay 1985, 245). *Methods and Metaphysics in Early Molecular Genetics* 73 mean that one had to change one's approach. "The only avenue of progress in

molecular biology today, as in atomic physics then, is to develop better techniques and to do more ingenious experiments” (Fischer and Lipson 1988, 231). The integration of phage and molecular genetics, and in part also their combination with classical genetics, is most clearly indicated by the work of Seymour Benzer, a member of the phage group, in the 1950s. Considering Hershey’s and Chase’s conclusions that the genetic information of phage is almost certainly carried in its DNA and accepting the model of DNA structure proposed by Watson and Crick, Benzer used phage (T4 phage), in order “to translate linkage distances, as derived from genetic recombination experiments, into molecular units” (Benzer 1955, 345). This was part of a “program designed to extend genetic studies to the molecular (nucleotide) level.” By mapping the fine structure of a gene, the rII region of the phage T4, he redefined the gene and brought classical genetics into contact with the molecular interpretation of genes based on DNA. He was the first to give (in 1955) a molecular definition of the functional concepts of classical genetics transmission, recombination, and mutation (Holmes 2000). Benzer acknowledged Max Delbrück “for his invaluable moderating influence.”²⁴

Metaphysics and Scientific Change – Concluding Remarks Fundamentally different approaches may coexist in a newly developing field of research. The differences can be related to different metaphysical assumptions leading to different motivations and methodologies. They are also caused by different

professional backgrounds. In contrast to many studies which claim a determining influence of metaphysical assumptions, or “styles of thought,” this study shows that the initial ostensible disparity and non-integratibility of two such approaches was not a principle cause. It was overcome within a relatively short period of time. 24 In his later review of this period, Benzer revealed what was behind this phrase: “I wrote up the story of the rII mutants and showed the manuscript to Delbrück in Amsterdam later that summer [1954]. One of his typically succinct comments was: ‘Delusion of grandeur’. Delbrück knocked the paper so badly that not until a visit to Caltech the following spring did I dare to approach him with another version. He submitted it to the Proceedings of the National Academy of Sciences, and it contained an appropriate acknowledgment of his ‘moderating influence’” (Benzer 1966, 162); for further details, see Holmes (2000, 132-134). According to Holmes, Delbrück had by then become severely critical of certain aspects of Watson’s and Crick’s model; another example of his readiness to criticize views that he once supported (though this time Delbrück’s criticism was proved wrong). 74 ute deichmann This study supports the proposition that scientists may give up their own theories and accept theories which are fundamentally different from their own if those theories or, more generally, approaches, turn out to be advantageous – philosophers of science suggest as indicators empirical evidence, explanatory power, fertility, simplicity, and

relevance (Charpa 2001). The fact that some theories or approaches are superior to others in the sense just described and that influential scientists adopted the new approaches even when they contradict their own, has played an important role in scientific change at least in modern empirical sciences. The best example – and counter-example to Planck’s own dictum – is Max Planck himself. Originally an opponent of atomism – Planck thought that it was fundamentally opposed to the law of entropy increase – he gradually changed his mind in the 1890s because he realized the explanatory power of atomism and the unification it brought to many physical and chemical phenomena. He became a strong supporter of atomism and critic of Ernst Mach who continued to reject it. In like manner, many adherents of phlogiston theory later accepted the theory of oxidation.²⁵ This study also demonstrates that different scientific “styles” or “cultures,” contrary to claims of some science commentators, need not result in a disparity of research but may turn out to be either reconcilable (as in the case of phage and molecular genetics) or they are examples of approaches at an early phase of a field that turn out to be qualitatively different and of which one will disappear after some time (Deichmann 2007). Theses on the role of metaphysics and/or social factors in scientific research may help explain short term phenomena such as individual or local differences in the reception of new theories or in the adherence to questionable or flawed work of a renowned researcher. But assumptions that scientific

facts are merely socially constructed or that there is a deterministic effect of metaphysics cannot explain crucial features of scientific change. By not distinguishing between different qualities of research – according to the foregoing criteria – they cannot explain the rapid general acceptance of theories by outsiders, such as Avery (in 25 Among the many other examples are Wilhelm Ostwald, the fiercest opponent of atomism, who changed his mind after the work of Einstein, Smoluchowsky, and Perrin on Brownian movement had provided new scientific evidence for it; Thomas Hunt Morgan who at first considered Mendelian genetics unscientific but later became one its greatest proponents (Allen 1978); biochemists who after turning to colloid chemistry changed their approaches again when they realized its lack of fruitfulness, e.g. Karl Landsteiner, Jacques Loeb, and Leonor Michaelis (Deichmann 2007); and the majority of organic chemists who after many years of rejecting or neglecting the existence of macromolecules, accepted them from the late 1920s. Methods and Metaphysics in Early Molecular Genetics 75 genetics), and Delbrück, and young scientists without influence or even without positions (such as Crick and Watson). They are also unable to account for the stability of certain theories over long periods of time, such as basic features of Mendelian genetics, the notion of DNA as hereditary substance, or the model of its double helix structure.

From Metaphysics to Molecular Biology By Howard L. Kaye

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