El machismo camaleón: The Nobel Committee Case

VMOG • 07/03/2019

Visión general

Premio Nobel

Desde 1901 en 5 categorías

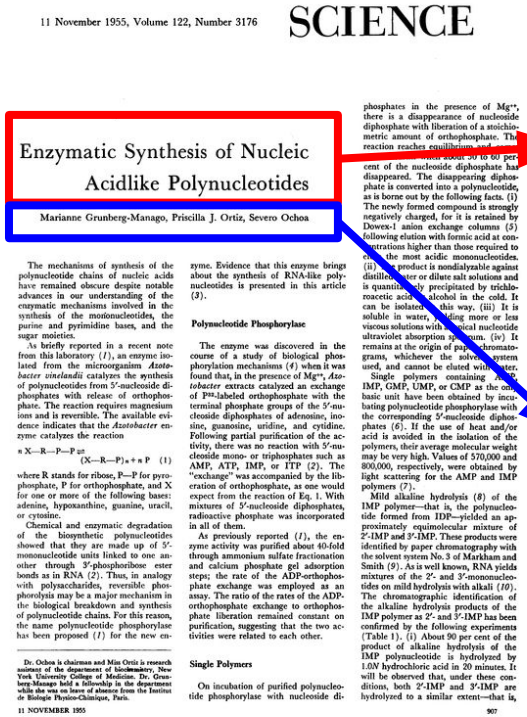
Españoles

8: 6 literatura y 2 medicina

Mujeres

51/853=6%

Medicina 1959: Síntesis biológica del ARN y del ADN



11 November 1955, Volume 122, Number 3176 **SCIENCE**

Enzymatic Synthesis of Nucleic Acidlike Polynucleotides

Marianne Grunberg-Manago, Priscilla J. Ortiz, Severo Ochoa

The mechanisms of synthesis of the polynucleotide chains of nucleic acids have remained obscure despite notable advances in our understanding of the enzymatic mechanisms involved in the synthesis of the mononucleotides, the purine and pyrimidine bases, and the sugar moieties.

As briefly reported in a recent note from this laboratory (*1*), an enzyme isolated from the microorganism *Azotobacter vinelandii* catalyzes the synthesis of polynucleotides from 5′-nucleoside diphosphates with release of orthophosphate. The reaction requires magnesium ions and is reversible. The available evidence indicates that the *Azotobacter* enzyme catalyzes the reaction

$$n\,X\text{—}R\text{—}P\text{—}P \rightleftarrows (X\text{—}R\text{—}P)_n + n\,P \quad (1)$$

where R stands for ribose, P—P for pyrophosphate, P for orthophosphate, and X for one or more of the following bases: adenine, hypoxanthine, guanine, uracil, or cytosine.

Chemical and enzymatic degradation of the biosynthetic polynucleotides showed that they are made up of 5′-mononucleotide units linked to one another through 3′-phosphoribose ester bonds as in RNA (*2*). Thus, in analogy with polysaccharides, reversible phosphorolysis may be a major mechanism in the biological breakdown and synthesis of polynucleotide chains. For this reason, the name polynucleotide phosphorylase has been proposed (*1*) for the new enzyme. Evidence that this enzyme brings about the synthesis of RNA-like polynucleotides is presented in this article (*3*).

Dr. Ochoa is chairman and Miss Ortiz is research assistant of the department of biochemistry, New York University College of Medicine. Dr. Grunberg-Manago held a fellowship in the department while she was on leave of absence from the Institut de Biologie Physico-Chimique, Paris.

Polynucleotide Phosphorylase

The enzyme was discovered in the course of a study of biological phosphorylation mechanisms (*4*) when it was found that, in the presence of Mg^{++}, *Azotobacter* extracts catalyzed an exchange of P^{32}-labeled orthophosphate with the terminal phosphate groups of the 5′-nucleoside diphosphates of adenosine, inosine, guanosine, uridine, and cytidine. Following partial purification of the activity, there was no reaction with 5′-nucleoside mono- or triphosphates such as AMP, ATP, IMP, or ITP (*2*). The "exchange" was accompanied by the liberation of orthophosphate, as one would expect from the reaction of Eq. 1. With mixtures of 5′-nucleoside diphosphates, radioactive phosphate was incorporated in all of them.

As previously reported (*1*), the enzyme activity was purified about 40-fold through ammonium sulfate fractionation and calcium phosphate gel adsorption steps; the rate of the ADP-orthophosphate exchange was employed as an assay. The ratio of the rates of the ADP-orthophosphate exchange to orthophosphate liberation remained constant on purification, suggesting that the two activities were related to each other.

Single Polymers

On incubation of purified polynucleotide phosphorylase with nucleoside diphosphates in the presence of Mg^{++}, there is a disappearance of nucleoside diphosphate with liberation of a stoichiometric amount of orthophosphate. The reaction reaches equilibrium and [illegible] when about 50 to 60 percent of the nucleoside diphosphate has disappeared. The disappearing diphosphate is converted into a polynucleotide, as is borne out by the following facts. (i) The newly formed compound is strongly negatively charged, for it is retained by Dowex-1 anion exchange columns (*5*) following elution with formic acid at concentrations higher than those required to elute the most acidic mononucleotides. (ii) The product is nondialyzable against distilled water or dilute salt solutions and is quantitatively precipitated by trichloroacetic acid or alcohol in the cold. It can be isolated in this way. (iii) It is soluble in water, yielding more or less viscous solutions with typical nucleotide ultraviolet absorption spectrum. (iv) It remains at the origin of paper chromatograms, whichever the solvent system used, and cannot be eluted with water.

Single polymers containing [illegible] IMP, GMP, UMP, or CMP as the only basic unit have been obtained by incubating polynucleotide phosphorylase with the corresponding 5′-nucleoside diphosphates (*6*). If the use of heat and/or acid is avoided in the isolation of the polymers, their average molecular weight may be very high. Values of 570,000 and 800,000, respectively, were obtained by light scattering for the AMP and IMP polymers (*7*).

Mild alkaline hydrolysis (*8*) of the IMP polymer—that is, the polynucleotide formed from IDP—yielded an approximately equimolecular mixture of 2′-IMP and 3′-IMP. These products were identified by paper chromatography with the solvent system No. 3 of Markham and Smith (*9*). As is well known, RNA yields mixtures of the 2′- and 3′-mononucleotides on mild hydrolysis with alkali (*10*). The chromatographic identification of the alkaline hydrolysis products of the IMP polymer as 2′- and 3′-IMP has been confirmed by the following experiments (Table 1). (i) About 90 per cent of the product of alkaline hydrolysis of the IMP polynucleotide is hydrolyzed by 1.0*N* hydrochloric acid in 20 minutes. It will be observed that, under these conditions, both 2′-IMP and 3′-IMP are hydrolyzed to a similar extent—that is,

Enzymatic Synthesis of Nucleic Acidlike Polynucleotides.
Science 122 (1955) 907.

M. Grundber-Manago, P. J. Ortiz y S. Ochoa.

Medicina 1959: Síntesis biológica del ARN y del ADN

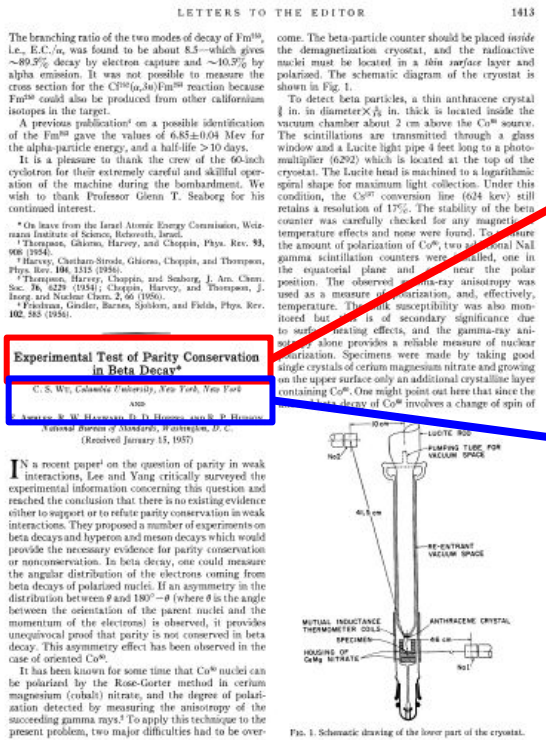
Severo Ochoa

Marianne Grundberg-Manago

Medicina 1959: Síntesis biológica del ARN y del ADN

Curiosidad/maldad: El resultado por el que le dieron el Nobel a Severo Ochoa se demostró ser **falso** pocos años después: la enzima descubierta, la **polinucleótido fosforilasa**, no sintetizaba ARN, proceso realizado por la ARN polimerasa. Así lo reconoció la academia sueca años después. No obstante, su descubrimiento sirvió para realizar otro más importante aún: el descifrado del código genético. Este descubrimiento volvió a valer un premio Nobel, pero en este caso el **olvidado** fue Severo Ochoa: ¿Cuestión de karma?

Física 1957: Leyes de paridad en partículas elementales



LETTERS TO THE EDITOR 1413

The branching ratio of the two modes of decay of Fm^{255}, i.e., E.C./α, was found to be about 8.5—which gives ~89.5% decay by electron capture and ~10.5% by alpha emission. It was not possible to measure the cross section for the $Cf^{253}(\alpha,3n)Fm^{255}$ reaction because Fm^{255} could also be produced from other californium isotopes in the target.

A previous publication[4] on a possible identification of the Fm^{252} gave the values of 6.85±0.04 Mev for the alpha-particle energy, and a half-life > 10 days.

It is a pleasure to thank the crew of the 60-inch cyclotron for their extremely careful and skillful operation of the machine during the bombardment. We wish to thank Professor Glenn T. Seaborg for his continued interest.

* On leave from the Israel Atomic Energy Commission, Weizmann Institute of Science, Rehoveth, Israel.
[1] Thompson, Ghiorso, Harvey, and Choppin, Phys. Rev. **93**, 908 (1954).
[2] Harvey, Chetham-Strode, Ghiorso, Choppin, and Thompson, Phys. Rev. **100**, 1315 (1955).
[3] Thompson, Harvey, Choppin, and Seaborg, J. Am. Chem. Soc. **76**, 6229 (1954); Choppin, Harvey, and Thompson, J. Inorg. and Nuclear Chem. **2**, 66 (1956).
[4] Friedman, Gindler, Barnes, Sjoblom, and Fields, Phys. Rev. **102**, 585 (1956).

Experimental Test of Parity Conservation in Beta Decay*

C. S. Wu, *Columbia University, New York, New York*
AND
[illegible], *National Bureau of Standards, Washington, D. C.*
(Received January 15, 1957)

IN a recent paper[1] on the question of parity in weak interactions, Lee and Yang critically surveyed the experimental information concerning this question and reached the conclusion that there is no existing evidence either to support or to refute parity conservation in weak interactions. They proposed a number of experiments on beta decays and hyperon and meson decays which would provide the necessary evidence for parity conservation or nonconservation. In beta decay, one could measure the angular distribution of the electrons coming from beta decays of polarized nuclei. If an asymmetry in the distribution between θ and $180°-\theta$ (where θ is the angle between the orientation of the parent nuclei and the momentum of the electrons) is observed, it provides unequivocal proof that parity is not conserved in beta decay. This asymmetry effect has been observed in the case of oriented Co^{60}.

It has been known for some time that Co^{60} nuclei can be polarized by the Rose-Gorter method in cerium magnesium (cobalt) nitrate, and the degree of polarization detected by measuring the anisotropy of the succeeding gamma rays.[2] To apply this technique to the present problem, two major difficulties had to be overcome. The beta-particle counter should be placed *inside* the demagnetization cryostat, and the radioactive nuclei must be located in a *thin surface* layer and polarized. The schematic diagram of the cryostat is shown in Fig. 1.

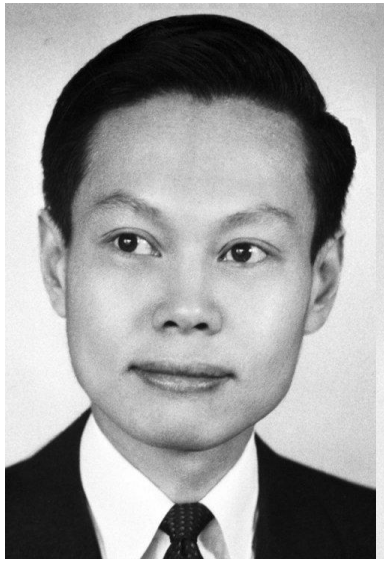
To detect beta particles, a thin anthracene crystal $\frac{1}{8}$ in. in diameter×$\frac{1}{16}$ in. thick is located inside the vacuum chamber about 2 cm above the Co^{60} source. The scintillations are transmitted through a glass window and a Lucite light pipe 4 feet long to a photomultiplier (6292) which is located at the top of the cryostat. The Lucite head is machined to a logarithmic spiral shape for maximum light collection. Under this condition, the Cs^{137} conversion line (624 kev) still retains a resolution of 17%. The stability of the beta counter was carefully checked for any magnetic temperature effects and none were found. To measure the amount of polarization of Co^{60}, two additional NaI gamma scintillation counters were installed, one in the equatorial plane and [illegible] near the polar position. The observed gamma-ray anisotropy was used as a measure of polarization, and, effectively, temperature. The bulk susceptibility was also monitored but [illegible] is of secondary significance due to surface heating effects, and the gamma-ray anisotropy alone provides a reliable measure of nuclear polarization. Specimens were made by taking good single crystals of cerium magnesium nitrate and growing on the upper surface only an additional crystalline layer containing Co^{60}. One might point out here that since the beta decay of Co^{60} involves a change of spin of

FIG. 1. Schematic drawing of the lower part of the cryostat.

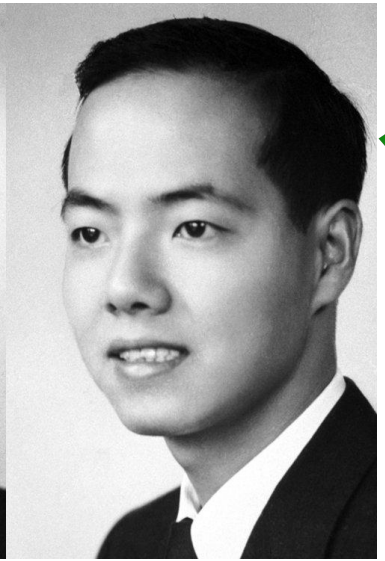
Experimental test on parity conservation in beta decay.
Phys. Rev. Lett. 105 (1957) 1413.

C. S. Wu.

Física 1957: Leyes de paridad en partículas elementales



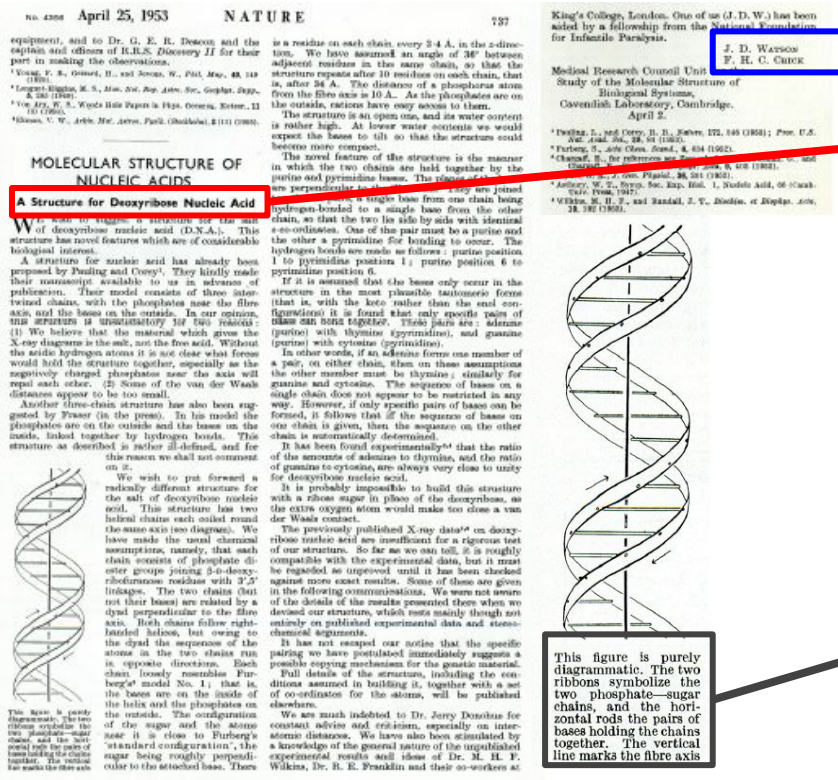
Chen Ning Yang



Tsung Dao Lee

Chien Siung Wu

Medicina 1962: Estructura molecular del ADN



No. 4356 April 25, 1953 NATURE 737

equipment, and to Dr. G. E. R. Deacon and the captain and officers of R.R.S. *Discovery II* for their part in making the observations.

MOLECULAR STRUCTURE OF NUCLEIC ACIDS

A Structure for Deoxyribose Nucleic Acid

King's College, London. One of us (J. D. W.) has been aided by a fellowship from the National Foundation for Infantile Paralysis.

J. D. WATSON
F. H. C. CRICK

Medical Research Council Unit for the Study of the Molecular Structure of Biological Systems, Cavendish Laboratory, Cambridge. April 2.

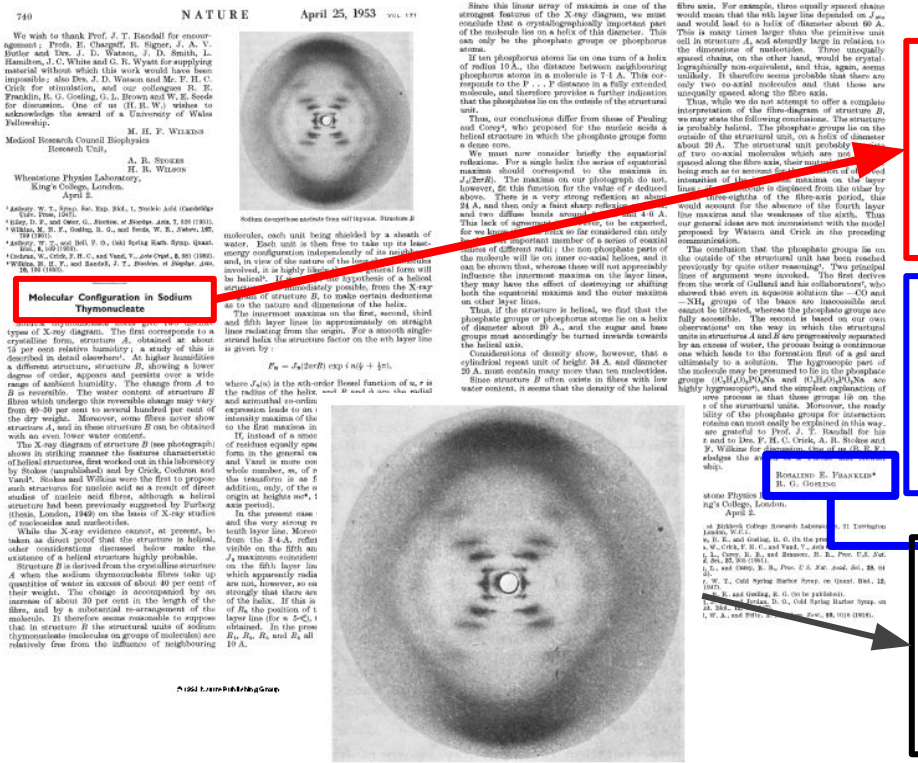
This figure is purely diagrammatic. The two ribbons symbolize the two phosphate—sugar chains, and the horizontal rods the pairs of bases holding the chains together. The vertical line marks the fibre axis

A structure for desoxyribose nucleic acid
Nature 171 (1953) 737.

J. D. Watson , F. H. C. Crick.

This figure is **purely** diagrammatic.
They forgot to add "and it is done by my wife".

Medicina 1962: Estructura molecular del ADN


740 NATURE April 25, 1953 Vol. 171

We wish to thank Prof. J. T. Randall for encouragement; Profs. E. Chargaff, R. Signer, J. A. V. Butler and Drs. J. D. Watson, J. D. Smith, L. Hamilton, J. C. White and G. R. Wyatt for supplying material without which this work would have been impossible; also Drs. J. D. Watson and Mr. F. H. C. Crick for stimulation, and our colleagues R. E. Franklin, R. G. Gosling, G. L. Brown and W. E. Seeds for discussion. One of us (H. R. W.) wishes to acknowledge the award of a University of Wales Fellowship.

M. H. F. Wilkins

Medical Research Council Biophysics Research Unit,

A. R. Stokes

H. R. Wilson

Wheatstone Physics Laboratory, King's College, London.

April 2.

Molecular Configuration in Sodium Thymonucleate

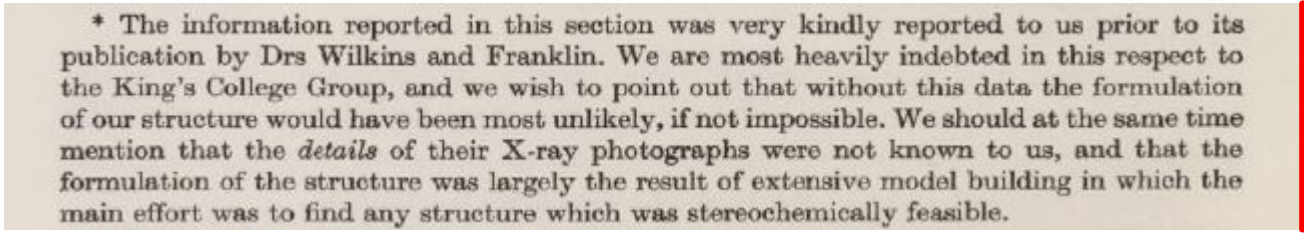
Sodium desoxyribose nucleate from calf thymus. Structure *B*

Molecular configuration in sodium thymonucleate.
Nature 171 (1953) 740.

R. E. Franklin, R. G. Gosling.

Sodium desoxyribose nucleate from calf thymus. **Structure**.

Medicina 1962: Estructura molecular del ADN

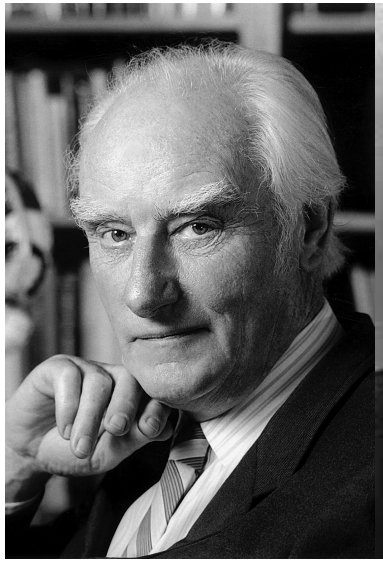


* The information reported in this section was very kindly reported to us prior to its publication by Drs Wilkins and Franklin. We are most heavily indebted in this respect to the King's College Group, and we wish to point out that without this data the formulation of our structure would have been most unlikely, if not impossible. We should at the same time mention that the *details* of their X-ray photographs were not known to us, and that the formulation of the structure was largely the result of extensive model building in which the main effort was to find any structure which was stereochemically feasible.

The complementary structure of deoxyribonucleic acid. Proc R Soc A 223 (1954) 80

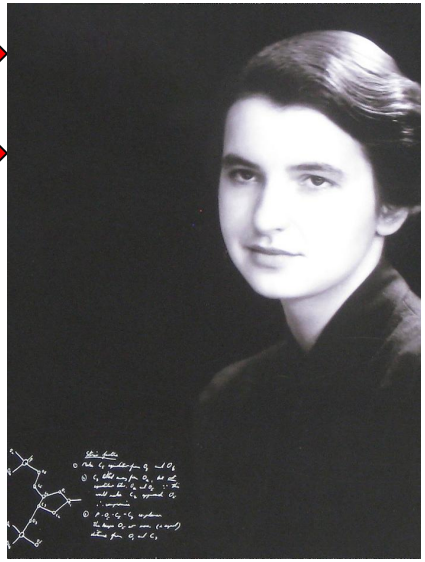
Curiosidad: Durante el desarrollo de su modelo, Watson y Crick nunca tocaron o miraron directamente una fibra de ADN. Su artículo no tiene ni un experimento, y consiste en especulaciones basadas en experimentos de otros científicos. En un pie de página de un artículo en 1954 Crick y Watson escribieron, “we wish to point out that without those data the formulation of our structure would have been most unlikely, if not impossible”. En 1999 Watson admitió, “the Franklin photograph was the key event”.

Medicina 1962: Estructura molecular del ADN



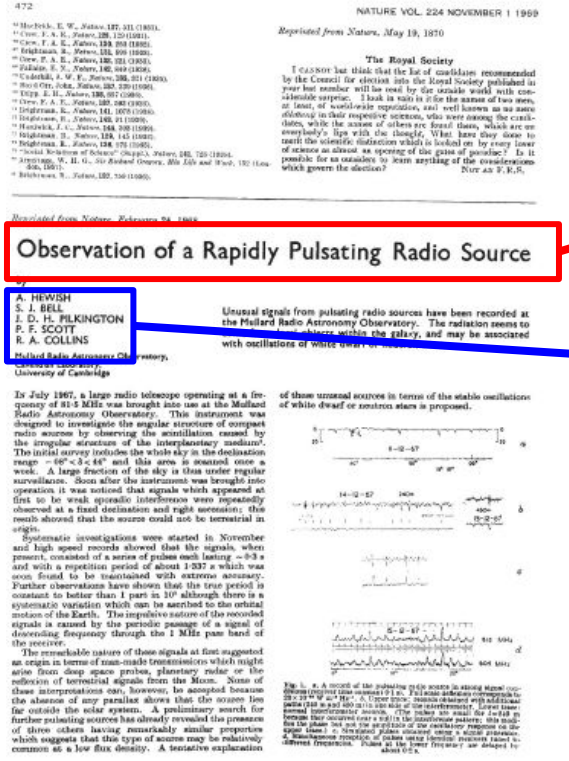
Francis Harry Crick

James Dewey Watson



Rosalind Franklin

Física 1974: Descubrimiento de los púlsares



472

NATURE VOL. 224 NOVEMBER 1 1969

Reprinted from Nature, May 19, 1870

The Royal Society

I CANNOT but think that the list of candidates recommended by the Council for election into the Royal Society published in your last number will be read by the outside world with considerable surprise. I look in vain in it for the names of two men, at least, of world-wide reputation, and well known as such effectively in their respective sciences, who were among the candidates, while the names of others are found therein, which are on everybody's lips with the thought, What have they done to merit the scientific distinction which is looked on by every lover of science as almost as opening of the gates of paradise? Is it possible for us outsiders to learn anything of the considerations which govern the election?

NOTE AS F.R.S.

Reprinted from Nature, February 24, 1968

Observation of a Rapidly Pulsating Radio Source

A. HEWISH
S. J. BELL
J. D. H. PILKINGTON
P. F. SCOTT
R. A. COLLINS

Mullard Radio Astronomy Observatory,
University of Cambridge

Unusual signals from pulsating radio sources have been recorded at the Mullard Radio Astronomy Observatory. The radiation seems to [illegible] within the galaxy, and may be associated with oscillations of white dwarf [illegible]

In July 1967, a large radio telescope operating at a frequency of 81·5 MHz was brought into use at the Mullard Radio Astronomy Observatory. This instrument was designed to investigate the angular structure of compact radio sources by observing the scintillation caused by the irregular structure of the interplanetary medium[1]. The initial survey includes the whole sky in the declination range $-08° < \delta < 44°$ and this area is scanned once a week. A large fraction of the sky is thus under regular surveillance. Soon after the instrument was brought into operation it was noticed that signals which appeared at first to be weak sporadic interference were repeatedly observed at a fixed declination and right ascension; this result showed that the source could not be terrestrial in origin.

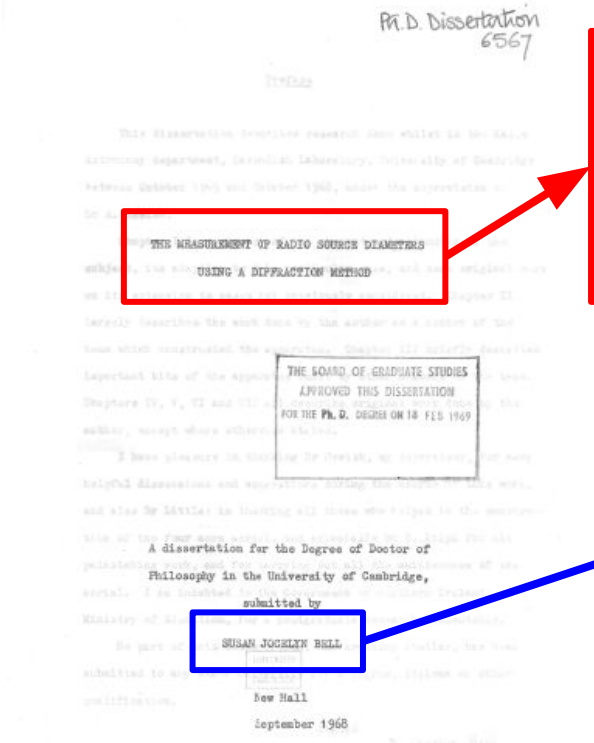
Systematic investigations were started in November and high speed records showed that the signals, when present, consisted of a series of pulses each lasting ~0·3 s and with a repetition period of about 1·337 s which was soon found to be maintained with extreme accuracy. Further observations have shown that the true period is constant to better than 1 part in 10^7 although there is a systematic variation which can be ascribed to the orbital motion of the Earth. The impulsive nature of the recorded signals is caused by the periodic passage of a signal of descending frequency through the 1 MHz pass band of the receiver.

The remarkable nature of these signals at first suggested an origin in terms of man-made transmissions which might arise from deep space probes, planetary radar or the reflexion of terrestrial signals from the Moon. None of these interpretations can, however, be accepted because the absence of any parallax shows that the source lies far outside the solar system. A preliminary search for further pulsating sources has already revealed the presence of three (table 1) having remarkably similar properties which suggests that this type of source may be relatively common at a low flux density. A tentative explanation of these unusual sources in terms of the stable oscillations of white dwarf or neutron stars is proposed.

Observation of a rapidly pulsating radio source.
Nature 224 (1969) 472.

A. Hewish, S. J. Bell, J. D. H. Pilkington, P. F. Scott, R. A. Collins.

Física 1974: Descubrimiento de los púlsares


Ph.D. Dissertation
6567

THE MEASUREMENT OF RADIO SOURCE DIAMETERS
USING A DIFFRACTION METHOD

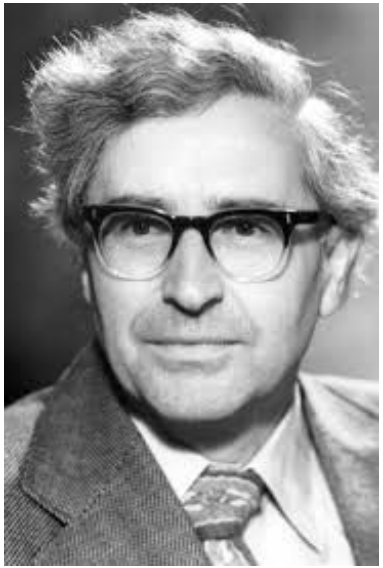
THE BOARD OF GRADUATE STUDIES
APPROVED THIS DISSERTATION
FOR THE Ph. D. DEGREE ON 18 FEB 1969

A dissertation for the Degree of Doctor of
Philosophy in the University of Cambridge,
submitted by
SUSAN JOCELYN BELL
New Hall
September 1968

The measurement of radio source diameters using a diffraction method.
PhD. Dissertation. (1964)
https://doi.org/10.17863/CAM.4926

S. J. Bell

Física 1974: Descubrimiento de los púlsares



Antony Hewish

Susan Jocelyn Bell

Conclusiones

1. Sexo y orientación sexual **no** son **discutibles**
2. El **género** es un constructo social
3. El trabajo de la mujer en ciencia ha sido **minorizado** porque la mujer está minorizada
4. Toda información ha de estar basada en datos que se puedan **contrastar**
5. Soy un **profesor** guay

Fin