

Citations and Sleep Episodes in '*The Double Helix*' (1968) Memoir by James Watson

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From my undergraduate days at the University of Colombo, Sri Lanka (1972-75), James Watson (b.1928) and Francis Crick (1916-2004) had attracted my interest for their major contributions to the development of biology and biochemistry in the 20th century¹⁻⁴. As an outcome of my interest, previously I had focused on different aspects on the stellar careers of Watson and Crick⁵⁻¹⁰.

In the text of '*The Double Helix*' memoir¹¹⁻¹³, Watson had written, "*Excitedly I pilfered Bernal's and Fankuchen's paper from the Philosophical Library and brought it up to the lab so that Francis (Crick) could inspect the TMV X-ray picture.*" TMV is the abbreviation for tobacco mosaic virus. What elicited my interest was the fact, while I was collecting information for a paper on the function of reprints (in the pre-digital era)¹⁴, I wondered whether Watson was referring to a reprint of a paper published in 1941, and verified with James Watson himself in 2011. To my query about this particular episode, Watson informed me, in his email response of June 10, 2011:

'Memories of filching the journal containing the Bernal and Fankuchen TMV paper from the Philosophical Library no longer exist in my brain. By pilfering I suspect I meant temporarily removing it without permission. I must have later returned it again without its librarian's notice.

*Hope this helps you!
Sincerely,
James D. Watson.*

In this essay, two specific issues of the *Double Helix* book authored by Watson, namely (1) citations to books and previously published research studies in the text and (2) an influence of sleep on idea generation, are commented.

Five books have been cited by Watson. These were, *The Nature of the Chemical Bond* (1939) by Linus Pauling, *What is Life?* (1944) by Erwin Schrodinger, *The Biochemistry of Nucleic Acids* (1950) by James Norman Davidson, *A Perch in Paradise* (1952) by Margaret Bullard and *The Thread of life: an introduction in Molecular Biology* (1966) by John Kendrew. Pauling's classic book '*The Nature of the Chemical Bond*' receives citations in two chapters. In the final paragraph of chapter 14, Watson had noted, 'Somewhere in Pauling's masterpiece I hoped the real secret would lie.' and Crick had gifted him a copy of this book for the 1951 Christmas. About the influence of Erwin Schrodinger's 1944 book '*What is Life?*', Watson had noted, 'This book very elegantly propounded the belief that genes were the key components of living cells and that, to understand what life is, we must know how genes act'; also, it was influential in switching Crick's interest from physics to biology.

Regarding the erroneous critical information in Davidson's book *The Biochemistry of Nucleic Acids*, that Watson had mentioned, three pointed comments made by Elguero¹⁵ deserve notice. These are, (1) 'In Watson's account, J.N. Davidson's book *The Biochemistry of Nucleic Acids* appears as the responsible for some of the difficulties to solve the structure of DNA.'; (2) 'Watson might have used the nucleosides not the

bases to build up the DNA model'. (3) 'A closer look at Davidson's text, however, reveals that most of the structures were correctly drawn the only exception being guanosine represented in the enol form.' Among the five books cited by Watson, details of the title and the author of a novel 'on the sexual misjudgments of Cambridge dons' was omitted in the 1968 edition. Subsequently, the 'Annotated and Illustrated' edition¹³ of 2012 offered these details as '*A Perch in Paradise*' authored by Margaret Bullard published in 1952.

Cited papers in Watson's book include Bernal and Fankuchen¹⁶, Franck¹⁷ and three from Gulland's group¹⁸⁻²⁰. In chapter 21, Watson passingly mentions about '*reading biochemical papers on the interrelations of DNA, RNA and protein synthesis*'. But he had omitted providing details on what these biochemical papers were as well as the authors of these papers and journal details. None of the above cited papers deal with RNA and protein synthesis.

To the best of my knowledge, the theme of influence of sleep on idea generation had failed to receive due recognition from the previous reviewers and commentators of Watson's memoir. In two particular chapters, Watson had recorded 'day dreaming' at night and falling asleep. First episode described in chapter 21 relates to his upset stomach and violent pains 'almost every evening', a visit to Cricks' newly bought house where Odile (Crick's wife) had served him 'a glass of warm milk and returning to his 'cold' room that had to be heated by lighting coal fire. The direct quotations are as follows:

"With my fingers too cold to write legibly I huddled next to the fireplace, daydreaming about how several DNA chains could fold together in a pretty and hopefully scientific way."

One paragraph later, Watson had continued, "Though I fell asleep contented with the thought that I understood the relationship between nucleic acids and protein synthesis, the chill of dressing in an ice-cold bedroom brought me back to the knowing truth that a slogan was no substitute for the DNA structure."

The second episode happened on the night, after Watson had seen the Heddy Lamar's then controversial movie *Ecstasy* (1932), with Peter Pauling and his own sister Elizabeth at the Rex theater. Watson had written

"It was late in the evening after I got back to my rooms that I tried to puzzle out the mystery of the bases....So I could be sure that I had the correct structures when I drew tiny pictures of the bases on sheets of Cavendish notepaper...But each time I tried to come up with a solution I ran into the obstacle that the four bases each had a quite different shape...My doodling of the bases on paper at first got nowhere, regardless of whether or not I had been to a film. Even the necessity to expunge *Ecstasy* from my mind did not lead to passable hydrogen bonds, and I fell asleep hoping that an undergraduate party the next afternoon at Downing would be full of pretty girls." (chapter 25).

These two anecdotes by Watson add to the previously recorded controversial reminiscences of two scientists [Friedrich Kekule²¹⁻²⁵ solving the benzene structure while riding atop a London bus in 1856 and Otto

Loewi²⁶⁻²⁹) verifying the chemical synaptic transmission in frog hearts during the Easter weekend of 1920] on being positively influenced by dreams in creative problem solving. In addition, Walker³⁰) had reviewed few cases of how dreams had influenced creation of compositions by Giuseppe Tartini in 1735 (*Trillo del Diavolo* – Devil's Trill sonata), Robert Schumann in 1854 (*Geister variationen* – Ghost variations) and Igor Stravinsky in 1918 (*L'histoire du soldat* – Tale of the Soldier).

Only recently, experimental studies in humans have confirmed that sleep inspires insight³¹) and benefits memory consolidation³²); but, mechanisms related to how sleep boosts creative problem solving are yet to be clarified³³).

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I dedicate this essay to the memory of my father Siva Sachithanantham, whose birth centenary is marked this year, for instilling to be a bibliophile in my salad days.

CONFLICT OF INTEREST

None

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