

CBPF-CS-006/85

TRÊS PONTOS MENORES NA HISTÓRIA DA CIÊNCIA

por

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TRÊS PONTOS MENORES NA HISTÓRIA DA CIÊNCIA

## APRESENTAÇÃO

Esta é uma coleção de três manuscritos de artigos que estão sendo enviados para publicação.

O primeiro, sobre um naturalista muito ligado ao Brasil, H.W. Bates, é na realidade uma proposta para uma investigação a ser realizada em arquivos na Inglaterra. É difícil para mim encontrar o necessário apoio financeiro, presumivelmente em função do meu status de amador na área. Espero então que sua publicação possa despertar o interesse de um pesquisador mais qualificado.

Sem dúvida alguma nem a Física nem a História seriam minimamente alteradas por um melhor conhecimento da data de nascimento de Maxwell. Espero, contudo, que essa pequena contribuição sirva para mostrar que alguns "momentos" da descoberta biográfica são parecidos com os da intuição científica.

O artigo sobre Franklin nasceu da minha intimidade com o estilo literário daquele grande americano. Franklin foi grande porque suas aspirações coincidiram com aquelas da maioria da nação americana em formação. No meu entender nem por isso devemos admirá-lo menos.

Ricardo Ferreira

Rio, 22 de maio de 1985

HENRY WALTER BATES AND THE CONTROVERSY ON EVOLUTION AND GROUP  
SELECTION

Henry Walter Bates (1825-1892) was one of the greatest British naturalists of all times. Concerning his celebrated paper read before the Linnean Society in 1861, "Contributions to an Insect Fauna of the Amazon Valley" [1], Darwin stated that it was "one of the most remarkable and admirable papers I ever read in my life" [2]. In this paper Bates describes for the first time insect mimicry and explains it in terms of the concepts of Natural Selection. Darwin continues: "I rejoice that I passed over the whole subject in the "Origin" for I should have made a precious mess of it" [3]. It was at the pressing of Darwin, who introduced Bates to the publisher, John Murray, that Bates' famous book "The Naturalist on the River Amazons" appeared in 1863. The book was a great success and became a classic. According to Darwin, who had a first-hand knowledge of the subject, Bates is second only to Humboldt when describing the tropical forest.

Bates' great scientific and literary achievements came early in his career, just after his extensive voyages in the Amazon Valley. There he had spent eleven years (1848-1859), the first two in company of Alfred Russel Wallace. In Bates' subsequent career there is something of unfulfilled expectations.

There is no full biography of Bates, the nearest being a small (97 pages) book, "Henry Walter Bates, F.R.S., Explorer, Scientist and Darwinian", written by H.P. Moon, Professor Emeritus of Zoology, University of Leicester, and published by the Leicestershire Museums, Art Galleries and Records Service in 1976. The question of Bates career after his return from the Amazon is summarized by Moon as follows: on account of his marriage

Bates felt it was his duty to find a remunerative post. Supported by Darwin, Hooker and other scientists he first applied for a suitable position at the British Museum (Natural History), only to be turned down in favour of the literateur O'Shanghnessy. One year afterwards (1864), and supported again by Darwin, John Murray and other prominent people, Bates applied for and obtained the position of Assistant Secretary of the Royal Geographic Society of London. Bates loyally served the Geographical Society until his death 27 years later. The importance of Geography, and of the Royal Geographic Society in particular, for the Imperial expansion of Britain is an undisputable fact. One feels, however, in common with Moon and other biographers, that a Naturalist of high caliber was somewhat lost to the biological sciences.

Could it be that Bates' career suffered from the fact that he came from "the lower classes" (in Victorian parlance) or from some circumstances of his marriage? His father was a dyer of hosiery, and at the time of Bates' marriage he gave as his profession that of worsted hosier. His wife, Sarah Ann Mason, of Leicester, was an illiterate working-class girl. Clodd, in his obituary of Bates [4] gives the date of his marriage as 1861, and Clodd was followed by many (for example, the *Dictionary of National Biography*). Moon says that Bates' first child, Alice, was born in February 2, 1862, and that the marriage took place only in 1863. Clodd changed the dates, probably to spare the feelings of relatives.

Although Darwin, Hooker and other leading scientists of the day remained friendly towards Bates, it is possible that his chances for full acceptance by the Scientific Establishment may have been

-3-

hampered by his marriage. One could recall that when Nicolai Ogarev (1813-1877), one of the founders of Russian Social-Democracy, and the closest friend of Alexander Herzen (1811-1870), married the English working-class girl, Mary Sutherland, he had to live in reclusion both in London and Geneva\*. And this, in Revolutionary émigré circles! [5]. Moon comments that Bates wrote Darwin slightly apologetic letters about his wife [Moon, p. 59].

With this background of the Man Bates we turn to Bates the Evolutionist. Bates was from the very first an avowed Darwinist, but his views of Evolution seem to have closer to Wallace's than to those of most of Darwin's followers. In modern terms Wallace was a *group selectionist* [6]. The question of the relative importance of *group and individual* selection has far reaching implications in human affairs. Group selection implies that infighting is harmful for the species, and lends support to a generous approach to human conduct in Society. That Evolution became by the last quarter of the XIXth Century, "the new religion of gain" [6] was due to the largely held belief in the supremacy of individual selection.

Ruse [6] shows that Darwin became convinced that in the *non-human* world selection acts at the level of the individual. Wallace, on the contrary, thought that the limiting level was group selection. Darwin sadly wrote to Wallace: "We shall, I greatly fear, never agree" [6]. With respect to Man's evolution Wallace never quavered in his belief that human morality

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\*After writing these words I read "The Romantic Exiles" over again and I found that Mary had also been a prostitute, which perhaps weakens my case a bit.



is subject to different laws; eventually he became a mystic and a Socialist, barely audible to the dominant forces of Society [8].

Darwin also thought that Man's moral sense is a unique factor in Evolution. Most of Darwin's followers, however, such as Huxley and Tyndall in England, Haeckel in Germany, etc., became convinced that "the survival of the fittest" (an expression coined by Herbert Spencer) applies to human society, thereby opening the path for Social Darwinists in Europe and in the United States.

What was Bates' position on this problem? Professor Moon's own viewpoint is clear: "There is no scientific excuse for condoning economic systems that produce wretchedness for human beings" (Moon, p. 12). But nowhere in his book is there an indication that this reflects Bates' position. A trustworthy witness, however, can be brought to bear that Bates was a determined oponent of Social Darwinism. The witness is Peter Kropotkin, the great Russian Anarchist, who wrote as follows in his "Memoirs of a Revolutionist" [9]:

"When Huxley published in 1888 his atrocious article, "The Struggle for Existence; a Program", I decided to put in a readable form my objections to his way of understanding the struggle for life, among animals as well as among men, the materials for which I had been accumulating for two years. I spoke of it to my friends. However, I found that the interpretation of "struggle for life" in the sense of a war-cry of "Woe to the Weak," raised to the height of a commandment of nature revealed by science, was so deeply rooted in this country that it had become

-5-

almost a matter of religion. Two persons only supported me in my revolt against this misinterpretation of the facts of nature. The editor of the *Nineteenth Century*, Mr. James Knowles, with his admirable perspicacity, at once seized the gist of the matter, and with a truly youthful energy encouraged me to take it in hand. The other supporter was the regretted H. W. Bates, whom Darwin, in his *Autobiography*, described as one of the most intelligent men he ever met. He was secretary of the Geographical Society, and I knew him; so I spoke to him of my intention. He was delighted with it. "Yes, most assuredly write it," he said. "That is true Darwinism. It is a shame to think of what they have made of Darwin's ideas. Write it, and when you have published it, I will write you a letter of commendation which you may publish." I could not have had better encouragement, and I began the work, which was published in the *Nineteenth Century* under the titles of "Mutual Aid among Animals," "Among Savages", "Among Barbarians", "In the Medieval City," and "Amongst Ourselves". Unfortunately I neglected to submit to Bates the first two articles of this series, dealing with animals, which were published during his lifetime; I hoped to be soon ready with the second part of the work, "Mutual Aid among Men", but it took me several years to complete it, and in the meantime Bates passed from among us."

What can we add to this observation? Did Bates ever write on this problem? Has he ever mentioned it in his correspondence? We feel the question is relevant and timely because, with the permanence of the social-darwinist controversy, both sides claim that they alone stand on the true evolutionary tradi-

tion, and Bates, from the very start, belongs to that tradition [10].

Information about Bates is scattered and there may well be a considerable amount of correspondence still to be discovered (Moon, pp. [83-84]). What is known of Bates' correspondence is in the British Museum, The Linnean Society, (all in London), and in the Leiscestershire Museum, Leiscester. There are also Presidential Addresses by Bates to the Royal Entomological Society (for the years 1868, 1869 and 1878), but I could not obtain copies of them. Neither could I obtain a copy a short account of Bates' life by H.L. Mckinney in Dict. Sc. Biography, C.G. Gillispie, ed., vol. I, pp. 500-504, Scribners, New York, 1970.

To summarize: Bates' ideas on the problem of group selection and the importance of Mutual Aid, voiced by Kropotkin, apparently lack documentary evidence. If this is indeed true, it is worth an investigation, so that his view could be known to historians.

## REFERENCES

- [1] H.W. Bates, *Linnean Soc. Trans.*, XXIII (1862)
- [2] T.S., Article on Bates in Dict. Nat. Biography.
- [3] *Ibid.*
- [4] E. Clodd, *Proc. Roy. Geog. Soc. London*, 14, 253 (1892)
- [5] E.H. Carr, "The Romantic Exiles", Beacon Press, Boston, 1961
- [6] M. Ruse, *Ann. of Science*, 37, 615 (1980).
- [6] Kenneth Clark, "Civilization", 1969.
- [8] Wilma George, "Biologist Philosopher: a Study of the Life and Writings of Alfred Russel Wallace", Abelard-Schuman, 1964.
- [9] P. Kropotkin, "Memoirs of a Revolutionist", Anchor Books, 1962, pp. 299-300. The point has been noticed by ethologists: see P.O. Hopkins, "Ce qu'ils on fai de Darwin est abominable", Fundamenta Scientiae, Strasbourg, 1976.
- [10] The relative contributions of Darwin and Wallace to the formulation of the theory of Evolution is analyzed by Wilma George (Reference 8).

QUAL A DATA DO NASCIMENTO DE MAXWELL?

Em 1978 H.C. Bolton e W.C. Price, físicos do King's College de Londres, publicaram um artigo sobre a existência na literatura de certa inconsistência sobre a data do nascimento de Maxwell (1). Alguns autores, começando pela biografia padrão de Maxwell, escrita por Campbell e Garnett (2), dão 13 de *ju*nho de 1831 como sua data de nascimento, enquanto que outros afirmam que Maxwell nasceu em 13 de *novembro* de 1831. Esta segunda data é a que aparece, por exemplo, tanto na *Encyclopedia Britannica* como na *Encyclopedia Americana*, e tem como fonte a versão impressa, editada em 1912, do *Livro de Admissões* do Peterhouse College de Cambridge, onde Maxwell matriculou-se como estudante em 1850 (3).

Levado por esta incerteza Bolton e Price fizeram uma série de pesquisas em Edinburgh, terra natal de Maxwell. Como o registro civil obrigatório só foi introduzido na Escócia em 1855, ano em que Maxwell completou 24 anos, eles se concentraram nos registros de batismo. De fato, na Igreja de St. Stephen, na paróquia onde Maxwell nasceu, Bolton e Price encontraram o seguinte registro:

"John Clerk Maxwell of Middlebie Esqr.  
 Advocate and Mrs. Francis Cay his  
 Spouse St. Stephen Parish a Son  
 Born 13 June 1831 Named  
 James Baptized 29 July 1831 by  
 the Revd David Ritchie."

Os autores concluem que a biografia de Campbell e Garnett (2) está correta. Mas perguntam porque a data de nascimento foi registrada em Peterhouse College como 13 de novembro? E

acrescentam: "There seems to be no obvious answer to this ques  
tion" (1).

Quando, em meados de 1980, li o artigo de Bolton e Price, me perguntei o que poderia ter levado Maxwell, ou talvez o se  
cretário de Peterhouse, a confundir *junho* com *novembro*. Ocorreu-me então que, ao numerar o mes em algarismos romanos - como se fazia muito na época - VI poderia facilmente estar escrito XI, e ser assim confundido com XI. Escrevi nesse sentido, em 10-6-1980, uma carta ao Professor Bolton. Em 9 de setembro Bolton, que tinha nesse intervalo voltado para sua Uni  
versidade na Australia, me respondeu com a carta impressa no Apêndice I. Três dias depois me enviou outra carta, impressa no Apêndice II, e acompanhada pelos documentos mostrados nos Apêndices III e IV deste trabalho.

Vemos que a minha "teoria" tinha sido proposta anteriormente por A.D. Buckingham (Apêndice III), que é um conhecido Professor de Cambridge e editor da revista *Chemical Physics Letters*. Uma situação semelhante com as que muitas vezes ocorrem na Ciência! O teste da "teoria", proposto por Buckingham, produziu um resultado curioso (Apêndice IV). Segundo o arquivista de Peterhouse, Mr. R. Lovatt, nos registros do Colégio *não*  
*há* *informação* alguma sobre a data de nascimento de Maxwell. Mas em 1912, ao editar uma versão impressa do Livro de Admissões, T.A. Walker acrescentou a informação errada de que a da  
ta era 13 de novembro de 1831. Este engano foi em seguida per  
petuado em várias biografias, outro fenômeno também conhecido na Ciência.

CLAYTON VICTORIA AUSTRALIA 3168

TELEPHONE: 03 541 0811 TELEGRAMS: Monashini Melbourne  
TELEX: Monash AA 32691

DEPARTMENT OF PHYSICS  
Professor H. C. Bolton (Chairman)  
Professor W. A. Rachinger  
Professor T. F. Smith

Your Ref:  
In Reply Please Quote:

9 September, 1980.

Professor R. Ferreira,  
Universidade de São Paulo,  
Instituto de Física e Química de São Carlos,  
Campus de São Carlos,  
SÃO CARLOS (SP),  
BRAZIL, South America.

Dear Professor Ferreira,

Thank you very much for your letter of 10 June regarding the date of birth of Maxwell; your letter has just reached me by sea mail.

Your suggestion about the confusion of the two Roman numerals is a possibility and I will tell Professor W. C. Price about it. We will write to Peterhouse to see what the records say.

You will notice that I give my permanent address above; I was at King's College, London, on sabbatical leave at the time.

With many thanks,

Yours sincerely,

HCBolton

H. C. Bolton.





CL. \_\_\_\_\_

Telephone: 541 0811 Telegrams: Monashuni Melbourne

From: Professor H. C. Bolton,  
Chairman,  
Department of Physics,  
Monash University,  
Clayton, Vic. 3168, Australia.

12 September, 1980.

Professor R. Ferreira,  
Universidade de São Paulo,  
Instituto de Física e Química de São Carlos,  
Campus de São Carlos,  
SAO CARLOS (SP),  
BRAZIL, South America.

Dear Professor Ferreira,

I hope you got my earlier letter of 9 September, replying to yours of 10 June, 1980.

I had forgotten when I replied to you that I had some further information about the Maxwell date of birth, and I am forwarding copies of two letters. You will see that Professor A.D. Buckingham had considered the same explanation as you and that the Archivist at Peterhouse, Dr. R. W. Lovatt, had made a search to no avail.

Yours sincerely,

*H.C. Bolton*

H. C. Bolton.

Copy letters sent separately.

APPENDICE III

-13-

CAMBRIDGE,

CB2 1EW

TELEPHONE (0223) 66499

Professor W.C. Price, F.R.S.

18-iv-78

Dear Bill,

A note to say that I enjoyed reading your note with Bolton on the date of birth of James Clerk Maxwell.

A possible explanation for the error in the Peterhouse record is that the date was shown as 13-XI-1831 and that this was interpreted by someone (T. A. Walker?) in Peterhouse as 13-XI-1831 instead of 13-VI-1831.

To see if one could verify this "theory" I wrote to the archivist

at Peterhouse to ask if I might see the entry. He has sent me the enclosed letter.

With best wishes

Yours sincerely

David Buckingham

14 APR 1978

PETERHOUSE

CAMBRIDGE

CB2 1RD

13th April 1978

Dear Buckingham,

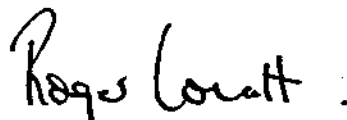
Thank you for your letter of the 12th April concerning Clerk Maxwell's date of birth.

The Peterhouse Admissions Book simply states that James Clerk Maxwell, son of John C. Maxwell of Dumfries, was admitted as a Pensioner on 22nd April 1850. No date of birth is given, and no part of the entry is in Maxwell's hand. I should add that the Admissions Book never seems to record a date of birth although it does sometimes give a man's age, expressed simply in terms of years only.

However, the editor of the printed version of the Admissions Book, T.A. Walker, has added the (erroneous) date of birth, 13th November 1831. As far as I can tell, this date does not appear in any of the college's records and I can only conclude that Walker obtained it from some external source, or perhaps himself made the mistake between 'v' and 'x' which you mention in your letter.

In other words, the whole matter seems to be something of a mare's nest. There seems to be no contemporary collegiate record giving any date for Maxwell's birth, and it looks as though the erroneous date may have first appeared as late as 1912 when Walker produced the Admissions Book.

Yours sincerely,



Dr R. W. Lovatt

Professor A. D. Buckingham,  
University Chemical Laboratory,  
Lensfield Road,  
Cambridge.

✓ Ack'd 18-iv-78

## REFERÊNCIAS

- (1) H.C. Bolton and W.C. Price, Notes & Records Roy. Soc. London,  
32, 213 (1978)
- (2) L. Campbell and W. Garnett, "The Life of James Clerk Maxwell",  
MacMillan, Londres, 1882.
- (3) Sir Brian Pippard, citado na ref. (1).

WHEN DID FRANKLIN INVENT BIFOCAL SPECTACLES?

-17-

It is now two centuries since Benjamin Franklin described his invention of bifocal spectacles. Franklin arrived in France in 1776 and it was during his residence in Passy, near Paris, that he described bifocals in a letter to his friend George Whately dated 21 August 1784 (1):

"... I cannot distinguish a Letter even of Large Print; but am happy in the invention of Double Spectacles, which serving for distant objects as well as near ones, make my Eyes as useful to me as ever they were".

It seems that Whately drew Franklin's invention to the attention of Peter Dollond, optician and instrument maker in London, who told Whately at first that he thought double spectacles could only serve for particular eyes. Franklin's letter to Whately dated 23 May 1785 gives a detailed description of bifocals:

"By M. Dollond's Saying, that my double Spectacles can only serve particular Eyes, I doubt the has not been rightly informed of their Construction. I imagine it will be found pretty generally true, that the same Convexity of Glass, through which a Man sees clearest and best at the distance proper for reading, is not the best for greater Distances. I therefore had formerly two Pairs of Spectacles, which I shifted occasionally, as in travelling I sometimes read, and often wanted to regard the Prospects. Finding the Change troublesome, and not always sufficiently ready, I had the Glasses cut and half of each kind associated in the same Cir-

cle, thus (see illustration). By this means, as I wear my Spectacles constantly, I have only to move my Eyes up or down, as I want to see distinctly far or near, the proper Glasses being always ready. This I find more particularly convenient since my being in France, the Glasses that serve me best at Table to see what I eat, not being the best to see the Faces of those on the other Side of the Table who speak to me; and when one's Ears are not well accustomed to the Sounds of a Language, a Sight of the Movements in the Features of him that speaks helps to explain; so that I understand French better by the help of my spectacles".

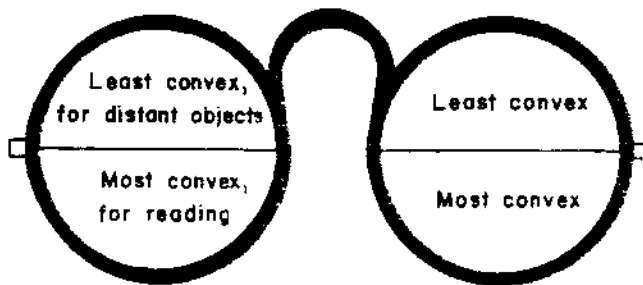


FIG.1 Benjamin Franklin's illustration of his bifocals

Still following Levene (1), Whately replied to Franklin on 22 July 1785 saying:

"The Dollonds are obliged by what you have been at pains to say, & describe of yr double spectacles. They fully comprehend it at the same time say, for such Sight as yours are common. That therefore they only make for such as like yours when bespoke".

-19-

Levene concludes, correctly I think, that this seems to indicate that the Dollands had previous knowledge of bifocals, and that although not readily available, they had been made before on special order (1).

It is not my purpose here to discuss Levene's beautiful paper. Suffice is to say that Levene (1) comes to the conclusion that at least two people, the famous painters Benjamin West (1738-1820) and Sir Joshua Reynolds (1723-1792) wore bifocals several years before the Franklin/Whately letter of 1784. The question Levene poses next, is how long before 1784 did Franklin first built double (i.e. bifocal) spectacles. Levene recalls Franklin's statement in his second letter to Whately: "This I find more particularly convenient since my being in France...", and he interprets "since my being in France" as something like "from the moment of my arrival in France". If this were true, it would mean that Franklin had invented bifocals in 1776, shortly after his arrival in France.

As I read Levene's paper and thought about Franklin's letter of 23 May 1785 I began to compare it with other Franklin's sentences. It seemed an inescapable conclusion that Franklin never used the word *since*, in likely contexts, with a *temporal meaning*. What he meant to say in the letter was that, *being in France*, the need to see the features of a person who was speaking to him became urgent. Eventually he solved this problem by wearing bifocals.

If this is true, it is impossible to say for how long before 21 August 1784 (the date of his first letter to Whately) did Franklin wear bifocals, unless new evidence comes up.



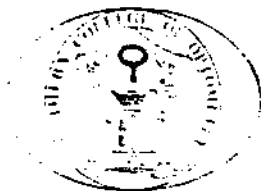
Thinking about these matters I decided to send a letter to Dr. Levene stating my case. To my surprize he readily accepted my point, stating in a letter (printed as an Appendix to this paper) that he will incorporate my comments into his new book.

Although this problem is of little compas, it shows in a concrete way the difficulties of communication and recording of scientific and technical results still existing at the end of the XVIIIth century. Correspondence between members of the "Invisible College" was at least as important as printed books and regular academic publications. Franklin was a prominent member of the "College" and wrote thousands of letters during his lifetime (1706-1790). Possibly some still unpublished letter may enlighten us as to when he invented "Double Spectacles", so useful that, as he says in his inimitable prose, "If all the other Defects and Infirmities were as easily and cheaply remedied it would be worth while for Friends to live a good deal longer".

#### REFERENCE

- (1) J.R. Levene, Notes & Records. Roy. Soc. London, 27, 141 (1973).

## SOUTHERN COLLEGE OF OPTOMETRY



John R. Levene, O.D., Ph.D.  
Dean of Faculty

August 29, 1977

Mr. Ricardo Ferreira  
Universidade Federal de Pernambuco  
Departamento De Física  
Cidade Universitaria  
50,000-Recife-Pe-Brasil

Dear Dr. Ferreira:

Thank you for your letter. I'm pleased you found my paper of interest. Yes, I can now appreciate what Franklin meant and also what he said. Your point is well taken.

Your comment about your knowledge of the structure of Franklin's writings was intriguing.

I shall try to incorporate your comments into a future edition of my new book Clinical Refraction and Visual Science (Butterworths, 1977), which contains the Franklin paper. The book is primarily a history of optics (clinic and physiological) and you might find it of interest. I would certainly appreciate your comments.

With kind regards,

  
John R. Levene

JRL:1a