DAYLIGHT

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Fabre's Faith through Science

Like all true scientists, **Fabre** recognized the narrow limits of human knowledge and did not fear to admit them. According to him, neither life nor instinct results from matter; we must seek for an explanation not below but *above* it, and of all the marvels created that compel us to look upward and proclaim the Supreme Intelligence whence they are derived, this is one of the most striking and persuasive: 'The more I see and the more I observe, the more does this intelligence shines forth behind the mystery of things.' Fabre thus joins hands with **Pasteur** … as one of the most distinguished defenders of spiritual science and belief against materialistic science and atheism. [*Life of Fabre*, p. 266]

[Photo: Praying Mantis © alberfoto—Fotolia.com]

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St Thomas Aquinas **St Bonaventure**
St Oliver Plunkett (for Ireland)

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Professor Maciej Giertych, BA, MA (Oxon), PhD, DSc

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To inform Catholics and others of the scientific evidence supporting Special Creation as opposed to Evolution, and to show that the true discoveries of Science are in conformity with Catholic doctrines on Origins.

ACTIVITIES

Daylight Origins Society is a non-profit educational organisation funded by subscriptions, donations and sales of publications.

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Scientists who bugged Darwin

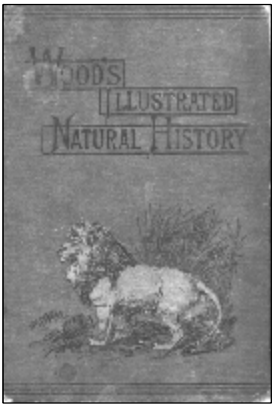
While much debate has taken place since the publication of Origin of Species in 1859 over the feasibility of humans evolving from some kind of great ape, there have been scientists whose studies of far smaller creatures have totally convinced them that the theory of evolution by natural selection is baseless. Among naturalists and zoologists, the category that includes perhaps the largest proportion of opponents of evolutionism would be the entomologists.

It is true that Darwin did cite several examples of insect features that he believed were adaptations for survival: "Although natural selection can act only through and for the good of each being, yet characters and structures, which we are apt to consider as of very trifling importance, may thus be acted upon. When we see leaf-eating insects green, and bark-feeders mottled grey … we must believe that these tints are of some service to these … insects in preserving them from danger." [1] He recounts the case of the high proportion [200 out of 550 species] of beetles in Madeira that have the advantage of a wingless state, which he surmises as being a consequence of natural selection.[2] Darwin acknowledges the problem of explaining how: "The

[1] Darwin, C. *Origin of Species*, (John Murray, 1872, 6th edn.,) p. 61.
[2] Ibid, p. 102-3

luminous organs which occur in a few insects, belonging to widely different families, and which are situated in different parts of the body, offer, under our present state of ignorance, a difficulty almost exactly parallel with that of the electric organs [of remotely allied fishes].[3] In discussing the "formidable array" of objections offered by "a distinguished zoologist, Mr St. George Mivart" to his theory, Darwin tackles the issue of insect protective resemblance to various objects. "The resemblance is often wonderfully close, and is not confined to colour, but extends to form, and even to the manner in which the insects hold themselves." [4]

There were many entomologists who could not accept that these relatively trivial examples provided a substantial justification for the evolutionary origins of insects – indeed, we have no problem in accepting that selection could reduce the variability of wing sizes or provide some benefit from camouflage. We recognise that the modern dodge of labelling the incidence of similar features in unrelated animals as 'parallel evolution' is a cop-out, not an explanation, and provides no empirical evidence at all.



The study of insect life might be imagined something of a minority interest if perusing *Natural History*, by Rev. J.G. Wood, of Merton College, Oxford, first published in 1852. This work "was intended as a companion to the British Museum," and begins with Man and other Primates; the section on insects fills only pages 407-437. However, the writer is aware of this shortfall, as he writes: "… it grew so rapidly, especially in the first two classes, the Mammals and Birds, that it was found necessary to conclude at the Insects, and even then to give an exceedingly short and meagre account of them. This was much regretted by me, as my experience had lain so much in the practical entomological part of Natural History, that during the earlier stages of the work I looked forward with some pleasure to giving a very much fuller account of the British Insects than will be found in the last few pages of this volume." It is no surprise, judging from other remarks in his book, that its author was opposed to Darwinism. [5]

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[3] Ibid., p. 141
[4] Ibid., p. 169-170. [Also cases of 'Batesian mimicry' on p. 352-354.] Example on back cover.
[5] Wood, J.G *Natural History* (Routledge & Sons, 1892) 19th edn., p. iv.

Characteristics of Class Insecta

Body of 3 regions:
head with large compound eyes;
feelers or antennae;
sensitive mouthparts (palps);
abdomen of up to 11 segments

X-ray image of fly
© posteriori - Fotolia.com

thorax of 3 segments,
each with a pair of legs,
2nd and 3rd with wings;
legs with same segments;
spiracles for breathing.

Had Rev. Woods begun his book with the insects, he might never have reached the vertebrates, as there are reckoned to exist about 800,000 species (around 80% of animal species) on Earth, compared with 4,500 mammals. Insects have been of interest to mankind owing to their huge range of form, behaviour, distribution, abundance, and economic and health effects, for both good and ill. Biblical references include the ant, bee, beetle, caterpillar, flea, fly, gnat, grasshopper, hornet, locust and moth. Robert Hooke's Micrographia (1665) was the first book to include drawings of insects seen through the newly developed microscope. He also first used the term 'cell' as a microscopic organic unit (though strictly speaking he was referring to plant cell walls, not to the living protoplasm).

Dragonfly fossil
© marcel – Fotolia.com

Increasing interest in insects from the seventeenth century on was shaped by cultural history, moral, political, economic and religious contexts. Collecting, observing, drawing, describing and classifying these ubiquitous inhabitants of the natural world became open to all. The complex instinctive behaviour of colonies of ants, termites and bees carried significance for social reformers. Urban growth fostered an increasing propensity to capture the beauties of beetles and butterflies in glass cases. The industrial and agricultural revolutions exacerbated the problems of pests of cattle, crops, timber, textiles, leather, paper, as well as vectors of human disease. Contemporary with Darwin, a pioneer in the development of economic entomology in England was Eleanor Ormerod; a renowned observer of insect structure and behaviour in France was Henri Fabre. [6] Neither of these scientists accepted Darwinism, and the fossil evidence of insects identical to modern forms gave no support to the theory. Darwin was conscious of the opposition of many entomologists, and wrote to Lyell (1863): "entomologists are enough to keep the subject back for half a century." [7] *Ed.*

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[6] See articles in this issue for more details.

[7] See Clark, J.F.M. *Bugs and the Victorians* (Yale University Press, 2009), p. 111.
A notable modern opponent of evolution is world butterfly expert Bernard D'Abrera (see *Daylight* 41). For details on insects and entomologists, see Karl Priest's www.insectman.us

Eleanor the Entomologist – contemporary of Darwin

Anthony Nevard

The writer considers himself privileged to have lived and worked, for over forty years, within two miles of the site of the shrine of the first English martyr – St Alban. [1] *A short walk from the Cathedral, down Holywell Hill, stands Torrington House, the final home of an outstanding Victorian scientist who deserves to be better known. Eleanor Ormerod's pioneering work with insects established economic entomology as a science of international importance and value, and enhanced the status of women in late Victorian times. She was a committed Christian, and not a supporter of Darwin's theory. [Part I of two follows.]*

By her own report in her autobiography, the seed of Eleanor's entomological career germinated when she was in her early twenties, and then living at her parental home of Sedbury Park, Gloucestershire.

"So far as a date can be given to what has been the absorbing interest of the work of my life, the 12th of March, 1852, would be about the beginning of my real study of Entomology. I fancy I attended to it more than I knew myself, for little things come back to memory connected with specimens being brought to me to name or look at, one in particular regarding a rare locust. The date was some time before coaches were discontinued, and the usual gathering of people in those days had collected at the door of the George Hotel in Chepstow to see the coach change horses, when, to the astonishment of all, a fine rose-underwinged locust appeared amongst them. Chepstow is on a steep hill, and the "George" about half a mile from the bridge.

The Ormerod home in Gloucestershire

[1] "St. Alban suffered on the 20th of June, near the city of Verulam, now, from him, called St. Alban's; a church of most exquisite workmanship, and suitable to commemorate his martyrdom, having been afterwards erected there as soon as peace was restored to the Christian church; in which place there cease not to this day the miraculous cures of many sick persons, and the frequent working of wonders." St. Bede the Venerable, *Historia Ecclesiastica Gentis Anglorum*: The History of the Primitive Church of England. Book One, Chapter Seven.

Locust and larva

Down the hill set off the locust, pursued by a party from the George, until it was captured at the bridge, and our family doctor conveyed it alive and uninjured to me. On my father sending it up to Oxford to Professor Daubeney as a probable curiosity, he identified it as being the first of the kind which had been taken so far west. If he gave us the name, I have forgotten it.[2] In March I began my studies by buying my first entomological book, and I chose beetles for the subject, and Stephens's "Manual of British Beetles" for my teacher. Those who know the book will understand my difficulties. It has no illustrations, glossary, nor convenient abstracts to help beginners, and, if such things existed in those days, they were not accessible to me. But I made up my mind that I was going to learn, and as *palpi*, *maxillae*, and names of all the smaller parts of the insects were wholly unknown to me, I struck out a plan of my own. From time to time I got one of the very largest beetles that I could find, something that I was quite sure of, and turned it into my teacher. I carefully dissected it and matched the parts to the details of the description given by Stephens. The process was very tedious and required great care, but I got a sound foundation, and by making a kind of synopsis of the chief points of classification I got a start." [3]

Eleanor's studies were enhanced through the acquisition of a microscope 'about 1864', having previously assisted her brother in the preparation of botanical specimens. In 1868, she read in the 'Gardener's Chronicle and Agricultural Gazette' of an exhibition in Paris having the twofold object,

> "...firstly, to investigate the economy and to extend the benefits resulting from insects serviceable to mankind; and secondly, to study the habits of those species which affect our gardens, orchards, farms or forests, in order to arrest their ravages or destroy them individually." [4]

This event led to the Royal Horticultural Society planning a similar project, and contributions were to be sent in for inclusion.

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[2] Locust drawing from E.A. Ormerod, *Manual of Injurious Insects* [2nd Edn.], London: Simpkin, Marshall, Hamilton, Kent & Co. Ltd., (1890), p.383 [probably drawn by Georgiana Ormerod].
[3] Eleanor Ormerod, LL.D. *Economic Entomologist, Autobiography and Correspondence*, R. Wallace (Ed.), John Murray (1904), pp. 53-54. [Over two-thirds of the book consists of edited correspondence].
[4] *ibid*, p. 55

> "All collectors and observers who might be willing to help were requested to communicate with Mr [Andrew] Murray, and without delay I availed myself of the opportunity, in pleasant anticipation of the entomological cooperation giving a use to what had been previously somewhat desultory observation." [5]

Eleanor considered herself to be "singularly well situated for the collection of ordinary kinds of injurious insects, and for the observation of their workings, as I then resided on my father's Gloucestershire property." [6] This comprised about 800 acres, but very varied, with old trees, deciduous woodland and forest, coniferous plantations, crop and garden pests, field pools, and the cliffs and pasturage bordering the River Severn, exposed to varying tidal cover. Miss Ormerod also had the willing assistance (encouraged by the distribution of 'Miss Eleanor's shillings') of the agricultural workers in collecting specimens. But her interest in nature and her intellectual capacity for her work were rooted in her unique parentage and early environment.

Early Life and Family Background

Born in Gloucestershire in 1828, the youngest of ten children of wealthy landowners, Eleanor tells of memorable moments in her upbringing – "being held up to see King William IV"; her "intense love of flowers; a fondness for insect investigation; and a fondness also for writing." [7] Eleanor was taught very well at home by her mother, "who had, in an eminent degree, the gift of teaching." [8] Her sister Georgiana, five years her senior, loved collecting shells, which eventually amassed 3,000 species. Her seven brothers were all educated by the famous Dr Arnold of Rugby School. Three entered the Church: the eldest, Thomas, was Archdeacon of Suffolk; the third brother, John, was Fellow of Brasenose, Oxford; the youngest became a Vicar in Norfolk. Brothers William and Edward, the fifth and sixth, qualified at St Bartholomew's hospital, William becoming surgeon at the Radcliffe Infirmary, Edward a physician and naturalist in Brighton. The second and fourth brothers started as solicitors, Wareing turning to Geology and becoming a Fellow of the Geological Society; Henry continued to practice in Manchester, but had wide knowledge and interests, becoming expert in areas

Georgiana Ormerod

[5] *ibid*, p. 55
[6] *ibid*, p. 56
[7] *ibid*, p. 2
[8] *ibid*, p. 4

of archaeology, genealogy, architecture, geology and natural history. Eleanor's cousin, Diana Latham, writes that,

> "The father and mother of this numerous flock were both remarkable people. Mr Ormerod, historian and antiquary, always occupied with literary or topographical research, was an autocrat in his own family... it was from [my aunt] that her daughters inherited their eye for colour and dexterity of touch. Mr Ormerod was a neat draughtsman of architectural subjects, but my aunt had taste and skill and a delight in her own branch of art – flower painting- that lasted all her life." [9]

Mr Ormerod was DCL, LL.D, FRS, FSA, and a magistrate; he had married Sarah, daughter of John Latham, one time President of the Royal College of Physicians, and physician to George IV. Clearly the Ormerods, proud of their Lancashire roots, were an extremely talented family.

In addition to the qualities of her parents, family life and education, Eleanor was brought up to learn the Scriptures, form good moral habits, and attend the (Anglican) Parish Church on Sundays. She does not claim any reminiscence of "precocious piety", but "... from my earliest days I was thoroughly well grounded in as much simple and necessary religious information as my small head could carry." [10] She writes that "The 'Oxford' or 'Tractarian' Movement of 1833-45 made an enormous commotion, and perhaps for a retired locality nowhere more so than in our own parish." Following the death of the old vicar, a Dr Armstrong brought in "the full tide of the Oxford Movement ... with the new arrangements came all sorts of trouble from an excess of ceremonial, and peace seemed to have vanished. The attempted setting up of confession caused much trouble, and difference of lay and clerical opinion in the restoration of the Church was a fertile cause of ill feeling." [11] It appears that such changes were not welcomed by the Ormerod family, and they were very grateful when Dr A. was appointed to a Bishopric in South Africa, to be replaced by a vicar with more moderate ideas of pastoral care of his flock!

Eleanor pays tribute to Georgiana's influence on her, not least in her setting up, from her mid teens, a lending library of improving books, initially for the children of local cottagers, farmers and friends. "My sister was a highly accomplished woman, a good linguist and historian, and a careful scriptural student. As a scientific entomologist and a Fellow of the Entomological Society of London, she was a co-operator with me in my work. She devoted her artistic talent for many years to the execution of excellent diagrams, serviceable for

[9] *ibid*, p. 14
[10] *ibid*, p. 27
[11] *ibid*, p. 28.

agricultural purposes, of insects injurious to farm and orchard produce, some of which she made over to the Royal Agricultural Society." [12]

Notable public events in Miss Ormerod's Victorian childhood include the changes brought by the coming of the railways from the 1830s, with the gradual decline of horse-drawn coaches for public transport; she also reports on the Chartist risings from 1839 to 1848, not far away in Monmouthshire, and the changes in attitudes of the workers at the family house.

Development of her career, and her major publications

Following the death of her father in 1873, and benefitting from a sizeable inheritance, Georgiana and Eleanor moved to Torquay, close to relatives, but later moved again to Isleworth (about 11 miles west of London), so they could be "... near Kew Gardens, where they were on intimate terms with Sir Joseph and Lady Hooker."[13] It was in 1873 that Eleanor's "first regular paper was printed in the Journal of Linn. Soc." And in the spring of 1877 she "...issued a short pamphlet of seven pages, entitled 'Notes for observation of injurious insects'." This included descriptions of "about eighteen of the commonest crop, fruit and forest insects" and notes on their breeding, effects of e.g. soil and weather conditions, and the nature of the damage they caused.[14] She invited experts to contact her with more information, which duly occurred.


A MANUAL
OF
INJURIOUS INSECTS
WITH
PREVENTION AND REMEDY
AS FAR AS APPLIED TO
FOOD CROPS, FOREST TREES, AND FRUIT.
WITH A SHORT
Short Introduction to Entomology.
COMPILED BY
ELEANOR A. ORMEROD, F.R.Met.Soc., &c.
SECOND EDITION.
LONDON:
SIMPKIN, MARSHALL, HAMILTON, KENT & CO., Limited.
1890.
All rights reserved.

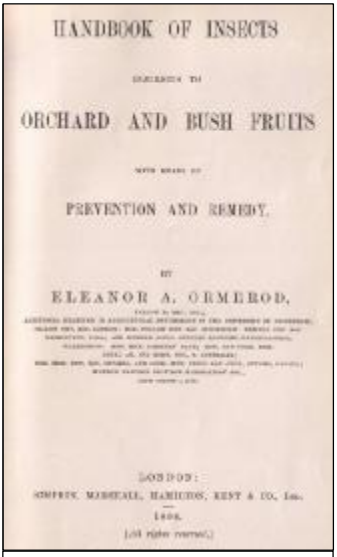
Title page of her first book

She then needed to reconsider how better to organise the expanded data, which she decided to categorise under headings of (a) farm crops, (b) orchard and bush fruits, and (c) forest trees. Within each class, the affected plant/crop was listed alphabetically. Eleanor showed a high degree of honesty and professional ethics in her principle of "giving the very fullest recognition possible of the source of the information" that she received from her many contributors.

[12] *ibid*, p. 31.
[13] *ibid*, p. 73
[14] *ibid*, p. 60

She cannot resist remarking that: “There are people who think nothing of appropriating the credit of true workers, and who absorb also rewards in the shape of salaries and official position based on their own questionable conduct.”[15] However, she naturally does not name anyone!

The collation of this information was compiled as Miss Ormerod’s ‘Annual Reports’ over a period of 22 years. A digest of this work was published in 1881as a book of 323 pages entitled: “Manual of Injurious Insects, with Methods of Prevention and Remedy”, expanded in 1890 by a ‘second edition of 450 pages’[16]. At her request, Robert Newstead formulated a reference resource for the data in the form of “The General Index to my Annual Reports on Injurious Insects, 1877-1898”. This received welcome acknowledgment, including a letter from the Board of Agriculture. In 1898, the special observations on fruit infestations were included under the title: “Handbook of Insects Injurious to Orchard and Bush Fruits, with Means of Prevention and Remedy.”


HANDBOOK OF INSECTS

ORCHARD AND BUSH FRUITS

PREVENTION AND REMEDY.

BY

ELEANOR A. ORMEROD.

LONDON:

1898.

Title page of her second book

In addition to the above books, Eleanor wrote several four-page leaflets intended for free wide circulation on the commonest farm pests, such as Wireworm, Cranefly, Mustard Beetle and Eelworm. Demand for the leaflet on the Warble fly required several reprints, running to 170,000 copies. [17]

Her demanding solo work of producing Annual updates continued until 1901, at which time it became apparent to Eleanor that much of the new information she was receiving bore mainly on scientific entomological details, or occasional local outbreaks of little interest to the majority of her commercial ‘target group’, or on the subject of pests and their control. Accordingly, she decided that the 1900 twenty-fourth Annual Report would be the final edition; in it, she wrote of her great regret for discontinuing the series, but explained how the work had begun (1877) when there was then little known or published on the

[15] *ibid*, p. 62
[16] *ibid*, p. 65 [However, my copy has only 410 pages, including the Index – Ed].
[17] *ibid*, p. 64-65

subject, and now "additional information is rare". She was (now in her early seventies) finding "the work was hard ... at times very fatiguing." She stressed her great debt of thanks to her contributors,

> "... and I trust they will believe that if, as I well know, much of my work has not been so well done as it would have been in better qualified hands, at least I have earnestly tried to do my very best." [18]

The range of her work

In addition to 'five or six months a year' she devoted largely to compiling her Reports, much of Eleanor's time was taken up in identifying specimens she was sent and in correspondence (hundreds of letters a year) with those of the agricultural and horticultural community affected by pests. Though these were mostly insects, in adult or larval form, she was also involved with controversy over campaigns in the late 1890s to control the House Sparrow (or 'avian rat'). Ecological implications were examined, such as whether eliminating sparrows, agreed to be a bird very destructive of crops, would in fact result in an increase of insect pests that would then escape predation.[19] Or that high sparrow numbers were driving off other birds, such as swallows and martins, which are more effective insectivores. In one of her letters to W. Tegetmeier, FZS, MBOU (a great authority on the life history of animals) Eleanor writes:

The House Sparrow

> "I most truly think it a great distinction that my name should be associated [on the title page of "The House Sparrow"] with that of an Ornithologist of such world-wide reputation as yourself, and as it is your wish I very heartily agree. The only alteration I would suggest is that word "Miss" should be removed. I do not like the word if it is not needed; and would it not be well to add a reference to my being an authorised agricultural worker? It may protect me from some "mendacities," and, a better reason, show that we are attentive to all three of the points (Ornithology, Entomology, and Agriculture) on which anti-passerine observation rests." [20]

The economic importance of entomology had come to the fore in 1881 with the disastrous attack of the Turnip fly (flea beetle) which cost farmers in England and Scotland an estimated over half a million sterling. [21] In 1882, Miss

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[18] *ibid*, p. 67

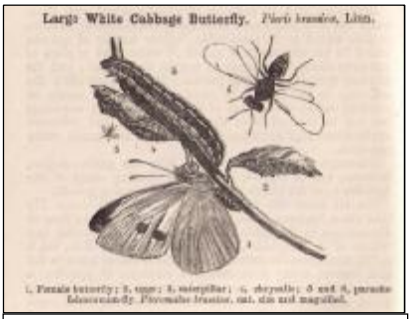
[19] Drawing of House Sparrow – *ibid*, p. 160

[20] *ibid*, p. 167-8 [The House Sparrow's scientific name is *Passer domesticus* – Ed.]

[21] £100 then would be worth perhaps £10,000 today!

Ormerod was appointed Consulting Entomologist to the Royal Agricultural Society of England, holding the post for ten years, until resigning owing to failing health. She was first required to attend an interview (June 1882) in Hanover Square to discuss this offer, which she found daunting. The President enquired about her qualifications, asking how long she had been devoted to Entomology. "My reply was 'about thirty years,' to which he had nothing further to say." She met with an unfortunate accident with a horse-drawn carriage at Waterloo Station; the fall led to lameness and pain for which she needed bodily rest and from which she never fully recovered. [22]

As Eleanor became more widely known and respected for her work and writing, she was also in demand for speaking roles, though these engendered in her no little anxiety. Over the years 1881 and 1884, she was "Special Lecturer on Economic Entomology" at the Royal Agricultural College, Cirencester. The six talks she gave, to audiences of about 120 students and professors, were: (1) Injurious insects; (2) Turnip Fly; (3) Effects of Weather on Insects; (4) Wireworm; (5) Insect Prevention (6) Oestridae- Warble or Bot Flies. [23] She resigned the post after three years, finding the preparation of lectures was taking up too much of her time. She also delivered a lecture at the Institute of Agriculture in South Kensington in 1883, to an audience of 500, half of them students, entitled: Insect Injuries to Farm Crops, and their Prevention". To begin, some definitions were necessary:



Large Cabbage White Butterfly

> "They were told to realise in the words of Professor Westwood that insects were: Annulose animals, breathing by tracheae, having the head distinct and provided in the adult stage with six articulated legs, and antennae, subject also to a series of moultings previously to attaining perfection, whereby wings are ordinarily developed!"

[22] *ibid*, p. 77. This incident was misreported, as she wrote to Professor Riley [April 10 1890]: "I have been greatly disturbed... by a report being published in several of our London papers that I had been thrown from a carriage and met with serious injuries. This is altogether erroneous, but the many applications, and much writing and wiring *[i.e. telegrams – Ed.]* to get the press to stop the report, has been indeed disturbing, and it has wasted me much time." *ibid*, p. 184.

[23] Drawing of Large Cabbage White from *Manual of Injurious Insects*, p. 18.

The audience burst out cheering, thinking, as Professor Tanner explained afterwards, that the scientific terms were being used as a joke. [24]

At a later date, Eleanor gave a course of ten lectures on the "Orders of Insects", though poorly organised and attended, which later formed the core of her book "Guide to the Methods of Insect Life," which received praise from Thomas Huxley and Sir Joseph Hooker.[25] She calls Professor Huxley "a valued friend," and also makes special mention of her colleagues "Professor Westwood, Life President of the Entomological Society; and Dr C.V. Riley, Entomologist of the Board of Agriculture of the U.S.A." Her ability to communicate internationally was aided by a talent for languages, as she described later in her life:

> "… I try not to write in any language but my own, but I can read serviceably French, Italian and Spanish, and also Latin for what I need; likewise, of course, German; Russian I could read once but not so readily now; and with the dictionary I can make something of Dutch and Norwegian." [26]

Following a packed lecture on "Injurious Insects" Eleanor gave in 1882 at the Richmond Athenaeum, Lady Hooker writes that,

> "Miss Lydia Becker, at that time a vigorous upholder of 'Woman's Rights' [sic] rose to speak, and while praising Miss Ormerod's able lecture, instanced her work as 'being a proof of how much a woman could do without the help of man.' Miss Ormerod ... thanked Miss Becker, but begged to say that she had no right to the praise accorded to her on the ground of her work being so entirely that of a lone woman, for, she said, 'No one owes more to the help of man than myself. I have always met with the greatest kindness and most generous aid from my friends of the other sex, and without their constant encouragement my poor efforts would have had no practical result in being of benefit to my fellow men.' " [27]

That same year [1882], Eleanor accepted an invitation to join a committee to advise on the improvement of the collections relating to Economic Entomology in the South Kensington and Bethnal Green museums. She was to continue this work until 1886, and later assisted in supervising the work. T.H. Huxley was also on the Committee and wrote to thank her in 1883, adding:

> " … you will find me always ready to do my best to aid in carrying out your views. You really know more about the business than all the rest of us put together." [28]

[To be concluded in the next issue].

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[24] *ibid*, p. 84. [Typical student reaction, eh? And this was 1883! Ed.]
[25] *ibid*, p. 85
[26] *ibid*, p. 78.
[27] *ibid*, p. 86
[28] *ibid*, p. 88

FATHER KIRCHER, S.J.: SCIENTIST, ORIENTALIST, AND COLLECTOR

James J. Walsh, M.D., PhD., LLD.

From *Catholic Churchmen in Science* (1906) [1] [Part II of two]

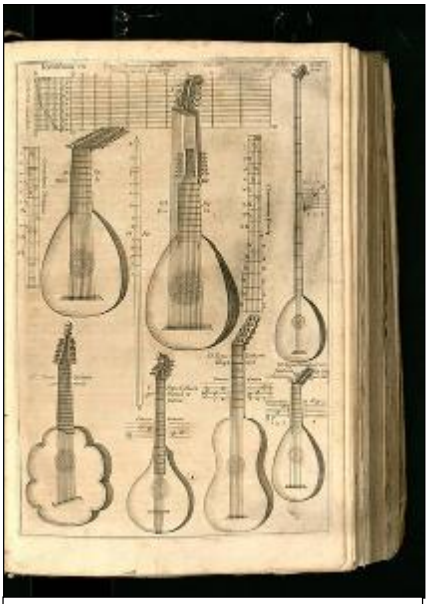
The life and work of Fr Athanasius Kircher SJ (1602-1680) provides a weighty counterbalance to the widely held opinion that churchmen at the time of Galileo (and since) were opposed to scientific research and progress. The first part of this article outlined his studies in magnetism, optics, music, geology, and oriental languages. This concluding part focuses more on his work in medicine and the germ theory of disease [Part 1 appeared in Daylight No 53]. Ed.

It is often a subject for conjecture just how science was studied and taught in centuries before the nineteenth, and just what text-books were employed. A little familiarity with Father Kircher's publications, however, will show that there was plenty of very suitable material for text-books to be found in his works. Under his own direction, what at the present time would be called a text-book of physics, but which at that time was called "Physiologia Experimentalis," was issued, containing all the experimental and demonstrative parts of his various books on chemistry, physics, music, magnetism, and mechanics, as well as acoustics and optics. This formed the groundwork of most text-books of science for a full century afterwards. Indeed, until the beginning of the distinctly modern science of chemistry with the discoveries of Priestley and Lavoisier, there was to be little added of serious import in science.

Perhaps the most commendable feature of Father Kircher's books is the fact that he himself seems never to have considered that he had exhausted a subject. The first work he published was on magnetism. Some twelve years later he returned to the subject, and wrote a more extensive work, containing many improvements over the first volume. The same thing is true of his studies in sound. In 1650, when not quite fifty years of age, he issued his "Musurgia Universalis," a sub-title of which stated that it contains the whole doctrine of sound and the practical and theoretical philosophy of music. A little over

[1] Published by *American Ecclesiastical Review – The Dolphin Press* 1906.

twenty years later, however, he published the "Phonurgia Nova," the sub-title of which showed that it was mainly concerned with the experimental demonstration of various truths in acoustics and with the development of the doctrine he had originally stated in the "Musurgia."



Plucked Instruments – from *Musurgia Universalis*

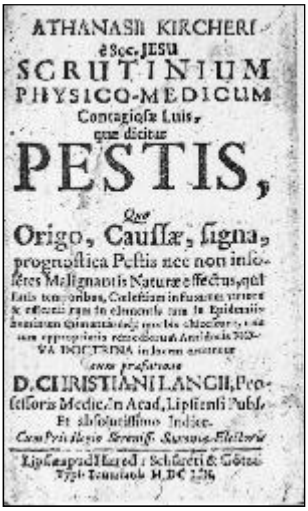
It is no wonder that his contemporaries spoke of him as the *Doctor centum artium*—the teacher of a hundred arts—for there was practically no branch of scientific knowledge in his time in which he was not expert. Scientific visitors to Rome always considered it one of the privileges of their stay in the papal city to have the opportunity to meet Father Kircher, and it was thought a very great honor to be shown through his museum by himself.

Of course, it is difficult for present-day scientists to imagine a man exhausting the whole round of science in this way. Many who have read but little more than the titles of Father Kircher's many books are accordingly prone to speak of him as a mine of information, but without any proper critical judgment. He has succeeded, according to them, in heaping together an immense amount of information, but it is of the most disparate value. There is no doubt that he took account of many things in science that are manifestly absurd. Astrology, for instance, had not, in his time, gone out of fashion entirely, and he refers many events in men's lives to the influence of the stars. He even made rules for astrological predictions, and his astronomical machine for exhibiting the motions of the stars was also meant to be helpful in the construction of astrological tables. It must not be forgotten, however, that in his time the best astronomers, like Tycho Brahe and even Kepler, had not entirely given up the idea of the influence of the stars over man's destiny.

As regards other sciences, there are details of information that may appear quite as superstitious as the belief in astrology. Kircher, for instance, accepted the idea of the possibility of the transmutation of metals. It is to be said, though, that all mankind were convinced of this possibility, and indeed not entirely

without reason. All during the nineteenth century scientists believed very firmly in the absolute independence of chemical elements and their utter non-interchangeability. As the result of recent discoveries, however, in which one element has apparently been observed giving rise to another, much of this doctrine has come to be considered as improbable, and now the idea of possible transmutation of metals and other chemical elements into one another appears not so absurd as it was half a century ago.

Anyone who will take up a text-book of science of a century ago will find in it many glaring absurdities. It will seem almost impossible that a scientific thinker, in his right senses, could have accepted some of the propositions that are calmly set down as absolute truths. Every generation has made itself ridiculous by knowing many things "that are not so," and even ours is no exception. Father Kircher was not outside this rule, though he was ahead of his generation in the critical faculty that enabled him to eliminate many falsities and to illuminate half-truths in the science of his day.


ATHANASII KIRCHERI
è Soc. JESU
SCRUTINIUM
PHYSICO-MEDICUM
Contagiosæ Luis,
quæ dicitur
PESTIS,
Quæ
Origo, Causæ, Signa,
prognostica Pestis nec non insoletes Malignantis Naturæ effectus, quæ
D. CHRISTIANI LANGII, Professoris Medici in Acad. Lipsiensi Publ.
Et absolutissimo Indice.
Lipsiæ, apud Haered. Schureri & Götzii.
Typis Translob. M.DC.XXX

Undoubtedly the most interesting of Father Kircher's scientific books is his work 'On the Pest', with some considerations on its origin, mode of distribution, and treatment, which about the middle of the seventeenth century gathered together all the medical theories of the times as to the causation of contagious disease, discussed them with critical judgment and reached conclusions which anticipate much of what is most modern in our present-day medicine. It is this work of Father Kircher's that is now most often referred to, and very deservedly so, because it is one of the classics which represents a landmark in knowledge for all time. It merits a place beside such books as Harvey on the Circulation of the Blood, or even Vesalius on Human Anatomy. As we have seen, it is now quoted from by our best recent authorities who attempt seriously to trace the history of the microbic theory of disease, and its conclusions are the result of logical processes and not the mere chance lighting upon truth of a mind that had the theories of the time before it. In it Father Kircher's genius is best exhibited. It has the faults of his too ready credibility; and his desire to discuss all possible phases of the question, even those which are now manifestly absurd, has led him into what prove to be useless digressions. But on the whole it represents very well the first great

example of the application of the principle of inductive science to modern medicine. All the known facts and observations are collected and discussed, and then the conclusions are suggested.

It is very interesting to trace the development of Father Kircher's ideas with regard to the origin, causation, and communication of disease, because in many points he so clearly anticipates medical knowledge that has only come to be definitely accepted in very recent times. It has often been pointed out that Sir Robert Boyle declared that the processes of fermentation and those which brought about infectious disease, were probably of similar nature, and that the scientist who solved the problem of the cause of fermentation would throw great light on the origin of these diseases. This prophetic remark was absolutely verified when Pasteur, a chemist who had solved the problem of fermentation, also solved the weightier questions connected with human diseases. Before even Boyle, however, Father Kircher had expressed his opinion that disease processes were similar to those of putrefaction. He considered that putrefaction was due to the presence of certain *corpuscula,* as he called them, and these he said were also probably active in the causation of infectious disease.

He was not sure whether or not these *corpuscula* were living, in the sense that they could multiply of themselves. He considered, however, that this was very probable. As to their distribution, he is especially happy in his anticipations of modern medical progress. While he considered it very possible that they were carried through the air, he gives it as his deliberate opinion that living things were the most frequent agents for the distribution of the corpuscles of disease. He is sure that they are carried by flies, for instance, and that they may be inoculated by the stings of such insects as fleas or mosquitoes. He even gives some examples that he knew of in which this was demonstrated. Still more striking is his insistence on the fact that such a contagious disease as pest may be carried by cats and dogs and other domestic animals. The cat seemed to him to be 'associated with special danger in this matter, and he gives an example of a nunnery which had carefully protected itself against possible infection, but had allowed a cat to come in, with the result that some cases of the disease developed.

An interesting bit of discussion is to be found in the chapter in which Father Kircher takes up the consideration of the problem whether infectious disease can ever be produced by the imagination. He is speaking particularly of the pest, but there is more than a suspicion that under the name pest came at times of epidemics many of our modern contagious diseases. Father Kircher says that

there is no doubt that worry plays an important role in predisposing persons to take the disease. He does not consider, however, that it can originate of itself, or be engendered in the person without contact with some previous case of pest. With regard to the question of predisposition he is very modern. He points out that many persons do not take the disease, because evidently of some protective quality which they possess. He is sure, too, that the best possible protection comes from keeping in good, general health.

A curious suggestion is that with regard to the grave-diggers and undertakers. It has often been noted in Italy, so Father Kircher asserts, that these individuals as a rule did not succumb to the disease, notwithstanding their extreme exposure, when the majority of the population were suffering from it. Toward the end of the epidemic, however, at the time when the towns-people were beginning to rejoice over its practical disappearance, it was not unusual to have these caretakers of the dead brought down with the disease—often, too, in fatal form. Father Kircher considers that only strong and healthy individuals would take up such an occupation. That the satisfaction of accomplishing a large amount of work and making money kept them in good health. Later on, however, as the result of overwork during the time of the epidemic and also of discouragement because they saw the end of prosperous times for them, they became predisposed to the disease and then fell victims.

With regard to the prevention of the pest in individual cases, Father Kircher has some very sensible remarks. He says that physicians as a rule depend on certain medicinal protectives or on amulets which they carry. The amulets he considers to be merely superstitious. The sweet-smelling substances that are sometimes employed are probably without any preventive action. Certain physicians employed a prophylactic remedy made up of very many substances. This is what in modern days we would be apt to call a "gun-shot prescription." It contained so many ingredients that it was hoped that some one of them would hit the right spot and prove effective. Father Kircher has another name for it. We do not know whether it is original with him, but in any case it is worth while remembering. He calls it a "calendar prescription," because when written it resembled a list of the days of the month.

His opinion of this "calendar prescription" is not very high. It seems to him that if one ingredient did good, most of the others would be almost as sure to do harm The main factor in prophylaxis to his mind was to keep in normal health, and this seemed not quite compatible with frequent recourse to a prescription containing so many drugs that were almost sure to have no good effect and

might have an ill effect. It is all the more interesting to find these common-sense views because ordinarily Father Kircher is set down as one who accepted most of the traditions of his time without inquiring very deeply into their origin or truth, simply reporting them out of the fulness of his rather pedantic information. In most cases it will be found, however, that, like Herodotus, reporting the curious things that had been told him in his travels, he is very careful to state what are his own opinions and what he owes to others and gives place to, though without attaching much credence to them.

It must not be forgotten that his great contemporaries, Von Helmont and Paracelsus, were not free from many of the curious scientific superstitions of their time, though they had, like him, in many respects the true scientific spirit. Von Helmont, for instance, was a firm believer in the doctrine of spontaneous generation, and even went so far as to consider that it had its application to animals of rather high order. For instance, one of his works contains a rather famous prescription to bring about the spontaneous generation of mice. What was needed was a jar of meal kept in a dark corner covered by some soiled linen. After three weeks these elements would be found to have bred mice. Too much must not be expected, then, of Kircher in the matter of crediting supposedly scientific traditions.

It may seem surprising that Father Kircher's book did not produce a greater impression upon the medical research work and teaching of the day and lead to an earlier development of microbiology. Unfortunately, however, the instruments of precision necessary for such a study were not then at hand, and the gradual loss of prestige of the book is therefore readily to be understood. The explanation of this delay in the development of science is very well put by Crookshank, who is the professor of comparative pathology and bacteriology at King's College, London, and one of the acknowledged authorities on these subjects in the medical world. Professor Crookshank says, at the beginning of the first chapter of his text-book on bacteriology, in which he traces the origin of the science, that the first attempt to demonstrate the existence of the *contagium vivum* dates back almost to the discovery of the microscope: -

> Athanasius Kircher nearly two and a half centuries ago expressed his belief that there were definite micro-organisms to which diseases were attributable The microscope had revealed that all decomposing substances swarmed with countless micro-organisms which were invisible to the naked eye, and Kircher sought for similar organisms in disease which he considered might be due to their agency. The microscopes which he describes obviously could not admit of

> the possibility of studying or even detecting the micro-organisms which are now known to be associated with certain diseases and it is not surprising that his teaching did not at the time gain much attention. They were destined, however, to receive a great impetus from the discoveries which emanated not long after from the father of microscopy, Leeuwenhoek.[2]

This reference to Kircher's work, however, shows that more cordial appreciation of his scientific genius has come in our day, and it seems not unlikely that in the progress of more accurate and detailed knowledge of scientific origins his reputation will grow as it deserves. With that doubtless will come a better understanding of the true attitude of the scholars of the time—so many of whom were churchmen—to so-called physical science in contradistinction to philosophy, in which of course they had always been profoundly interested. The work done by Kircher could never have been accomplished but for the sympathetic interest of those who are falsely supposed to have been bitterly opposed to all progress in the natural sciences, but whose opposition was really limited to theoretic phases of scientific inquiry that threatened, as has scientific theory so often since, to prove directly contradictory to revealed truth.

Other Jesuit Scientists

Anthony Nevard

Members of the Society of Jesus (Jesuits), founded in 1534 by St Ignatius of Loyola, have made numerous significant contributions to the development of science. By the eighteenth century, the Jesuits had contributed to the development of pendulum clocks, pantographs, barometers, reflecting telescopes and microscopes, and to scientific fields as various as magnetism, optics and electricity. They observed, in some cases before anyone else, the coloured bands on Jupiter's surface, the Andromeda nebula and Saturn's rings, and theorized about the circulation of the blood, the theoretical possibility of flight, the way the moon affected the tides, and the wave-like nature of light.

The entry in Wikipedia provides a list of Jesuit scientists which includes 27 individuals from the XVIIth century, 16 from the XVIIIth, 6 from the XIXth , 13 from the XXth, and 10 from the XXIst century (some living). [3]

[2] *A Text-Book of Bacteriology, Including the Etiology and Prevention of Infectious Diseases,* by Edgar M. Crookshank. Fourth Edition. London, 1896.

[3] https://en.wikipedia.org/wiki/List_of_Jesuit_scientists

Jesuit Astronomers with Chinese Scholars in the 18th Century [in public domain].

The missions of Jesuits to China in the 16th and 17th centuries introduced Western science and astronomy, then undergoing its own revolution. The Jesuits were especially valued for their knowledge of astronomy, calendar-making, mathematics, hydraulics, and geography, together with the mathematical tools for understanding the physical universe, including Euclidean geometry. [4]

Of those seventy-odd names listed on-line, only five appeared in *Asimov's Biographical Encyclopaedia of Science and Technology* (Pan Books, 1975), which included 1195 scientists. The other Jesuits all appear to have documented references in Wikipedia. Clearly Asimov had to be selective, but probably did not prioritise researching Catholic religious orders for good examples of outstanding scientists. Those whom he did include were:

- **Christoph Scheiner** (c.1573–1650), German astronomer noted for a dispute with Galileo Galilei over the discovery of Sunspots.
- **Francesco Maria Grimaldi** 1618–1663), Italian physicist, who coined the word 'diffraction' and used instruments to measure geological features on the Moon.
- **Giovanni Battista Riccioli** (1598–1671), Italian astronomer who was the first to note that Mizar was a "double star."
- **Athanasius Kircher** (1601–1680), German who in his *Scrutinium Pestis* of 1658 noted the presence of "little worms" or "animalcules" in the blood, and concluded that the disease was caused by micro-organisms. This is antecedent to germ theory.
- **Angelo Secchi** (1818–1878), Italian astronomer who discovered the existence of solar spicules and drew an early map of Mars.

The full list is impressive proof of the Church's *support* for science! *Ed.*

[4] Text source www.wikipedia.com [Creative Commons Attribution-ShareAlike License].

Scientific Illusions in Education (geology)

Guy Berthault, ingénieur diplômé de l'Ecole Polytechnique
Promotion 1945
Chevalier de la Légion d'Honneur et de l'Ordre National du Mérite

My works cover two domains for which the intellectual concepts involved – in the absence of fundamental experiments – could lead to erroneous deductions. I thought it necessary, therefore, in conjunction with suitably qualified organizations, to conduct fundamental experiments with optimal precision and objectivity. Set out below are the details, results and conclusions.

The founder of historic geology Nicolas Steno, known to *proceed in a very precise and ordered way according to the method of Descartes in 1667,* defined its fundamentals in his work *Canis Calchariae*.[1] He interpreted the superposition of strata as a succession of sedimentary deposits. [2]

From this he deduced in *Prodromus* the principles of stratigraphy. These were the superposition, continuity and original horizontality of strata, which are the basis of the relative geological time-scale.

Charles Lyell defined absolute chronology. In 1828 he travelled to Auvergne and examined the fresh water foliated rocks. As the foliated strata or laminae of less than a millimeter were said to be annual deposits, he realized the total (230 meters) would take thousands of years to form. In his 'Principles of Geology' (1832) he noted that there was a 5% renewal of the fauna during the 'ice age'. Assuming a constant renewal (uniformitarian hypothesis) it would take twenty times longer for a 'revolution' of the fauna to be produced. Now, Lyell calculated four revolutions since the end of the secondary era and eight others for the time before since the beginning of the primary era. As his contemporary James Croll estimated, for astronomical reasons, that glacial time lasted one million years, Lyell fixed as 240 million years as the base of the primary. This figure was increased by radiometric dating to 560 million in the 20th century. It was this apparent succession of species over a very long time that led Darwin

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1 N. Steno and N. Stensen, "Canis Carchariae Dissectum Caput, KIU" Aus., lat. u. engl. The earliest geological treatise, 1667.

2 F. Ellenberger, *"Histoire de la Géologie"*, Tome 1., Lavoisier.

to formulate his theory in his 1859 "Origin of the Species". He reasoned it was the natural selection of the species by the struggle for existence that produced evolution over time.

Two years later, Karl Marx wrote to Lassalle: *The book of Darwin is very significant. It shows that class warfare in history has its foundation in natural science.* Also Engels in "*Ludwig Feuerbach and the end of the German philosophy"* wrote: *The general demonstration made for the first time by Darwin was that all the products of nature around us now, including men, are the result of a long process of development from a small number of unicellular germs originally, and that these, in turn, stemmed from a protoplasm or from an albuminoidal body constituted from chemicals.* From this "discovery" of Darwin he deduced a law of the evolution of societies: *But what is true concerning nature, recognized equally as a process of historic development, is true also for the history of society in all its branches and all sciences which concern human things (and divine)*. (Marx, Engels, *Etudes philosophiques,* Ed.Sociales, pp.213-214).

Scientific socialism therefore proceeds from Darwin, as does national-socialism, with its advocacy for Aryan racial supremacy. Hence the Gulag and the Shoah, with their death toll of over 60 million.

The historical geology founded on the interpretation of Steno remains unproven, because there were no witnesses to the stratification. It was this fact that led me in 1970 to develop an experimental program to study the formation of strata. In sedimentary rocks there are strata, or laminae, of millimetric thickness similar to those observed by Lyell mentioned above. I took a sample (fig. 1) of 'Fontainbleau' sandstone containing these laminae. They were loosely cemented. I reduced the rock to its component particles of different sizes.

I fed the sand into a glass tube (fig. 2) and saw the same laminae form as those in the sample. The speed of sedimentation was determined by the operator. I understood that the phenomenon could be due to the sand being a powder whose mechanics are intermediate between liquids and solids. If, in a tube, three solid bodies are dropped successively, they will dispose in the order of their succession. Whilst if three liquids of different densities are dropped, such as mercury, oil and water, they will superpose in the decreasing order of their densities due to the effect of gravity. It can be expected, therefore, that gravity will cause the particles to sort out according to their size. Lamination is a

mechanical phenomenon not chronological. In consequence the thousands of laminae observed by Lyell did not correspond to hundreds of thousands of years.

The report of the experiments was presented to the French Academy of Sciences by Professor Georges Millot, director of the Strasbourg Institute of Geology, doyen of the University, then President of the Geological Society of France. The latter published my report in 1986. [3]

Following the publication, the Professor had me admitted to the Geological Society as a sedimentologist. I did the same experiment with the rock sample containing fossils. The result was the same. It was also published by the French Academy in 1988 [4] presented by Gorges Millot.

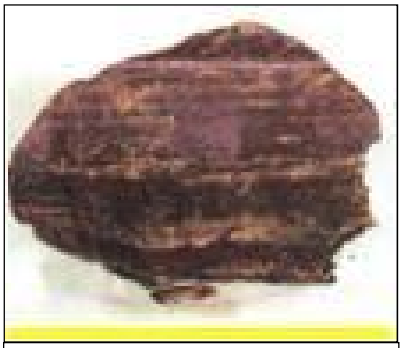

Figure 1 - sample of diatomite

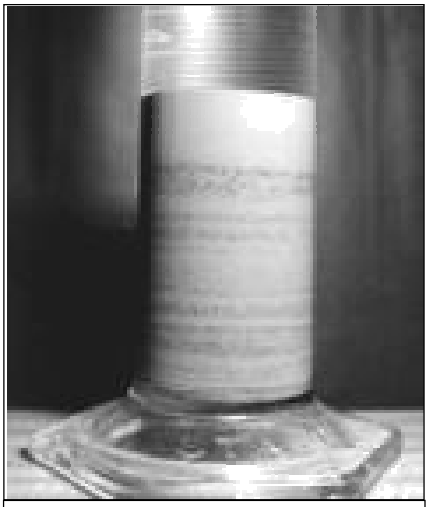

Figure 2 - lamination from dry flow

[3] G.B. Sedimentology, "Experiments on Lamination of Sediments, Resulting from a Periodic Graded-Bedding Subsequent to Deposit", compte-rendu de l'Académie des Sciences, Paris, t. 303, Série ii, No. 17, 1986.

[4] G. Berthault, "Sedimentation of a Heterogranular Mixture. Experimental Lamination in Still and Running Water", compte- rendu de l'Académie des Sciences, Paris, t. 306, Série ii, 1988, pp. 717-724.

What happens with thick strata?

A report entitled *Bijou Creek Flood* [5] published in the USA, authored by the American Geologist Edwin Mac Kee, referred to the stratified deposits on the banks of the *Bijou Creek* river. They resulted from the flood of the river from the Rocky Mountains following the melting snow increased by the rain. The phenomenon lasted less than 48 hours. With the continuity of the torrent, it could not be supposed that a first stratum had hardened into rock before a second had covered it as required by the principle of superposition. The strata were approximately 10 cm thick (see figure 3)

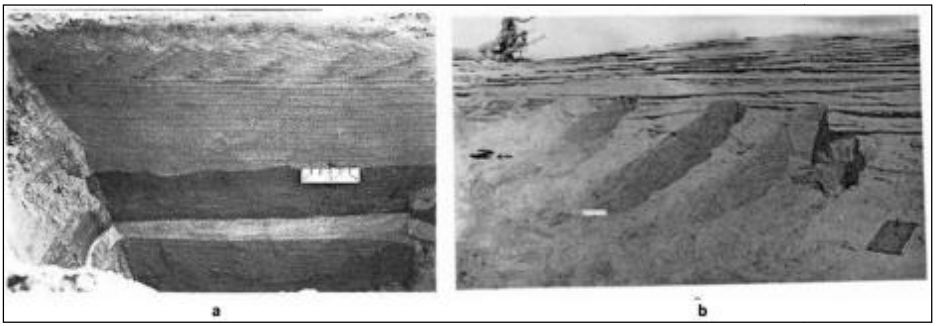

Figure 3. – Sedimentary structures of sedimentary deposits of the river "East Bijou" in 1965

a – alternate strata of sand and muddy sand b – stratification of deposits

To explain the phenomenon, the fact that the flood had reached 7 m/s in turbulent conditions must be taken into account, and the speed of current varies alternatively on the surface and in depth. Sedimentologists such as Hjulstrom and Lichstvan-Lebedev [6] have determined experimentally the critical speed of deposit of particles of distinct sizes. In flood conditions the capacity of sedimentary transport is very high, and the variation of speed at each point when it becomes critical causes the sedimentation of quantities of particles of distinct sizes. The grading observed in calm water becomes strata of several centimeters thickness in turbulent conditions. In 2008 the journal *Sedimentology* published an article on the tsunami that struck South-East

[5] E.D. McKee, E.J. Crosby, H.L. Berryhill Jr, "Flood Deposits, Bijou Creek, Colorado, June 1965", Journal of Sedimentary Petrology, Vol. 37, No. 3, 1967, pp. 829-851.

[6] Lischtvan-Lebediev, "Gidrologia i gidraulika v mostovom doroshnom. Straitielvie", Leningrad, 1959

Asia in 2004 with photos of the deposits left in its wake after several hours. Superposed strata are shown 20 cm thick.

It was now necessary to study stratification in the laboratory. A report by a group of American sedimentologists operating in the hydraulics laboratory of the State University of Colorado showed the presence of strata in the deposit of a circulating flume. I visited the University and signed a contract to determine the cause of the strata. The experiments were performed by a young member of the group Pierre Julien, Professor of Hydraulics and Sedimentology. In a flume, the water was mixed with sand. The large particles were colored black and the small white. The mixture was circulated by a pump. Due to the contrast of color in the particles, stratification in the sedimentary deposit could be observed. They developed laterally in the direction of the current, and vertically as it thickened. The deposit was laminated and stratified. A lateral section of the deposit showed a superposition of strata several centimeters thick, as shown in the photos below.

The report of the above experiment was published in 1993 by the Geological Society of France. [7]

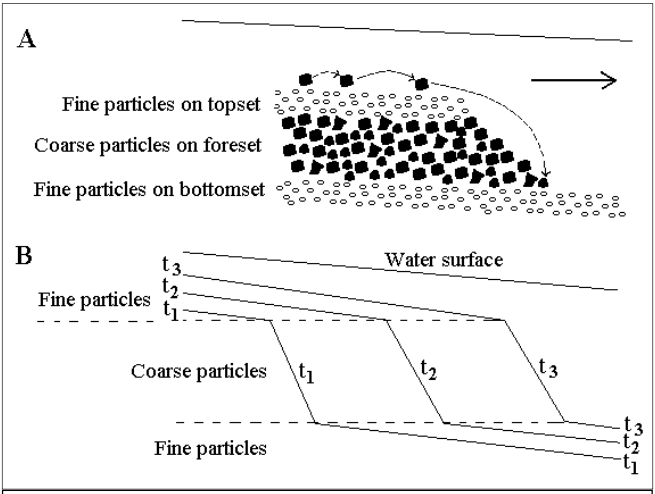

Figure 4 - Formation of graded layers

[7] F.Y. Julien and L.Y., Berthault G., "Experiments on Stratification of Heterogeneous Sand Mixtures", Bulletin de la Société Géologique de France, 1993, Vol. 164. No. 5, pp 649-660.

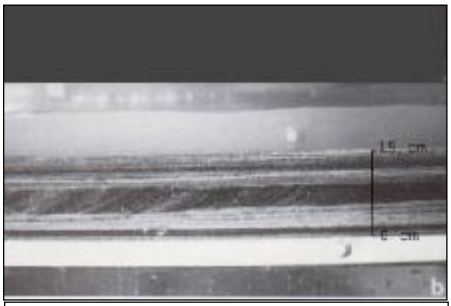

Figure 5 – Transversal section of the deposit

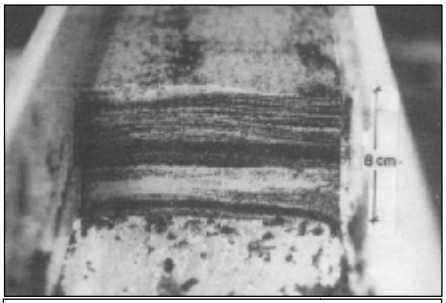

Figure 6 – Longitudinal view of the deposit

This new data questions Steno's interpretation by which a relative chronology on the basis of strata could be constructed according to his three principles. To elaborate a chronology one has to refer to the cause being rising and falling marine movements which deposit stratified ensembles called sequences. A growing number of sedimentologists and geologists are adopting the sequential stratigraphic method of reasoning. However they must go further as will be shown.

At the beginning of the year 2000 the time had come to apply the knowledge learned from the experiments and completed by other sources on the terrain. Providentially, during a trip to Moscow at that time I met a young geologist Alexander Lalomov who had taken a great interest in my published work. Thanks to him, I was able to have published in 2002 the report of our experiments in the USA in the Academy of Sciences and Institute of Geology in Russia under the heading of *Analysis of the main principles of stratigraphy on the basis of experimental data.*[8] In 2004 the same journal published my article *Sedimentological Interpretation of the Tonto Group* [9] explaining the fact that the facies of a geological series were superposed and juxtaposed at the same time in the area of deposit due to the sediments carried by the current. These studies were also published in China.[10]

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[8] G. Berthault, "Analysis of Main Principles of Stratigraphy", Lithology and Mineral Resources, Vol. 37, No. 5, 2002, pp. 509- 515. doi : 10.1023/A:1020220232661.

[9] G. Berthault, "Sedimentological Interpretation of the Tonto Group Stratigraphy, Grand Canyon Colorado River", Lithology and Mineral Resources, Vol. 39, No. 5, 2004, pp. 504-508, doi : 10.1023/B : LIMI.0000040737.85572.4c.

[10] G. Berthault, "Geological Dating Principles Questioned Paleohydraulics a New Approach", Journal of Geodesy and Geodynamics, Vol. 22, No. 3, 2002, pp. 19-26.

Alexander Lalomov determined the hydraulic and sedimentary genesis of rock formations in several regions in Russia. The most decisive of his works was to determine the time needed for a rock formation to be deposited, such as the Cambrian-Ordovician sandstone system of the Saint Petersburg region.[11]

Sedimentary mechanics evaluates from the critical speed of paleocurrents and function of particle size, the capacity of sedimentary transport and its speed. The quotient of the volume of the rock formation studied by its capacity, per unit of time and volume, indicates the time of the corresponding sedimentation. This method is applied by a number of sedimentologists amongst whom I would cite H. A. Einstein. The time ascertained by this method applied to the Cambrian-Ordovician sandstone system mentioned above represents 0.05% of the time attributed to it by the geological time-scale. The report of the study was published in 2011 by *Lithology and Mineral Resources,* journal of the *Academy of Sciences and the Institute of Geology of Russia.*[12]

Golovkinskii (Kazan 1868) on rocks and Walther on marine sediments established that:
Only facies and facies areas juxtaposed on the surface could have been superposed originally.[13] As explained in my 2002 publication the superposed and juxtaposed facies constitute a sequence resulting from a marine transgression or regression. A succession of sequences included between a transgression and a final regression is a 'series'. The data from sequence stratigraphy, and the experiments mentioned above, show that a series corresponds to a period. Consequently the sequence must be considered as the basic reference to relative chronology, rather than a 'stage'.

Today, sedimentologists, according to their sub-marine observations and laboratory experiments have established relationships between hydraulic conditions, depth and size of particles. This enables the critical speed of

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[11] A. Lalomov, "Reconstruction of Paleohydrodynamic Conditions during the Formation of Upper Jurassic Conglomerates of the Crimean Peninsula", Lithology and Mineral Resources, Vol. 42, No. 3, 2007, pp. 268-280.
doi : 10.1134/S0024490207030066.

[12] G. Berthault, A. Lalomov and M.A. Tugarova, *"Reconstruction of Paleolithodynamic Formation Conditions of Cambrian- Ordovician Sandstones in the Northwestern Russian Platform"* Lithology and Mineral Resources, Vol. 46, No. 1, 2011, pp. 60- 70. doi : 10.1134/S0024490211010020.

[13] G.V. Middleton, *"Johannes Walther's law of the correlation of facies"*, Geological Society of America Bulletin, 1973, Geological Soc America.

transport below which a particle of a given size will sediment to be determined. The Russian Hydraulics Institute is undertaking at my request an experimental program of erosion of sedimentary rocks by powerful currents (v < 27m/s) to complete these relations[14]. Others should follow. Relevant publications and videos are included on my website www.sedimentology.fr

In consequence the geological time-scale is called into question. It should henceforward be founded relatively not upon superposition of strata, but their origin which implies gravitational action for formation of laminae, and a turbulent current for strata and superposed and juxtaposed facies of sequences.

As to the absolute time of the foliated strata observed by Lyell and assumed to be annual deposits, they are principally laminae, which as shown by experiment provide no absolute time. The same applies to the 240-million years chronology based upon biological revolutions which Prof. Gohau called an unproven 'uniformitarian hypothesis'. Professor Gabriel Gohau, said in his book "*A history of Geology"(1990*) [15] "What measures time is the duration of sedimentation, and not orogenesis or biological revolutions". This leads to radiometric dating of rocks. The method is no longer viable because of the radioactivity which existed in the magma before it erupted. In a rock sample the respective related parent and daughter radio-active elements produced in the liquid magma were separated. Because of the effect of gravity, it is unlikely the elements would remain together for a ratio to be determined. An example is the potassium/argon dating of rocks resulting from volcanic eruptions whose historic dates are known. [16] The radiometric date for the origin of the rock, because of the excess argon, is sometimes given in millions of years.

Christian Marchal of ONERA, a polytechnician colleague, published in 1996 a study on the subject in *Bulletin du Museum d'Histoire Naturelle de Paris* (completed by an "erratum" in *Geodiversitas* – 1997). It was entitled: *Earth's*

[14] G. Berthault, A.L. Veksler, V.M. Donenberg and A. Lalomov, *"Research on Erosion of Consolidated and Semi-Consolidated Soils by High Speed Water Flow"*, Izvestia VMG, Vol. 257, 2010, pp. 10-22.
[15] G. Gohau, *"Une histoire de la géologie"*, Paris, Seuil, P.277. 1990.
[16] J.C. Funkhauser and J.J. Naughton, *"Radiogenic helium and argon in ultramafic inclusions from Hawaïi*" Journal Geological Research, Vol. 73, 15/07/1968, pp. 4601-4607.

polar displacements of large amplitude : a possible mechanism,[17] and showed that the uplift of a large mountain mass such as the Himalayas would modify by several millionths the moment of the Earth's inertia, sufficient to displace by several tens of degrees the stable equilibrium position of the poles. This published study stated specifically that large transgressions and regressions would result from the combined effect of the displacement of the poles and the Earth's rotation large transgressions of the ocean. Their amplitude would be much greater than ocean level variations due to glaciation or melting glaciers following cyclical variations of the orbital parameters of the Earth. In addition to the data of paleo-hydraulic analysis, this could explain, the existences of extensive flood conditions in the geological past rather than attributing them to falling meteorites. As stated in the *Bulletin*, the North Pole, at Eocene, before the Himalayan orogenesis, was at the mouth of the Siberian River Yenissei, at 72 degrees of north latitude. After the orogenesis, it was nearly at its present position following a movement of 18°.

The direction of marine transgressions and regressions following each of the 19 orogenesis since the beginning of the Primary era corresponds to the succession of sequence facies, such as sandstone, clay, schist, limestone. An example is the Tonto Group, in the Cambrian. It proceeds from the Cadomian orogenesis at the beginning of the Cambrian, and results, from the transgression of the Pacific Ocean up to New Mexico. Other directions can be ascertained from other orogeneses which occurred elsewhere on the Earth.

Contemporaneous submarine fauna varies according to depth, latitude, and longitude. The apparent change of fossilized marine organisms from one series to another following an orogenesis, could result from different fauna transported by the current from different areas caused by successive orogeneses. What has been attributed to a biological change could, therefore, be ecological in nature due to fauna coming from different orogeneses and taking into account the shorter period of sedimentation it now discloses.

It should be noted that, in recent times, collagen and organic tissue has been found in dinosaur fossils and radiometrically dated as forty-thousand years. According to the geological time-scale dinosaurs are said to have become extinct 65 million years ago.

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[17] C. Marchal, *"Earth's Polar Displacements of Large Amplitude. A Possible Mechanism"*, Bulletin du Muséum National d'Histoire Naturelle. Paris.4th, 18, Errata Geodiversitas, Vol. 19, No. 1, 1997, p. 139.

The conclusion of this section on geology is that a relation can be established between cause and effect. Orogenesis, which is the uprising of mountains contingent upon volcanic eruptions,[18] is the cause of polar rotational axis displacements. This provokes marine series and creates deposits of sedimentary rocks. The duration of these deposits being much more rapid than the time indicated by the geological time-scale shows the need for a revision of the latter.

The causal relation between orogenesis and sedimentary rocks, was the subject of my recent publications; *Georesources* journal of the University of Kazan, in December 2012,[19] *Open Journal of Geology*, at the *"International Conference of Geology and Geophysics"*, in Peking, in June 2013, at the geological conference in Kazan in October 2014 ; [20] it was also presented at the Moscow lithological conference in October 2015 by an American geological engineer Rachel Dilly. [21]

In light of the above facts, what remains of Darwin's theory and the aforementioned ideologies it engendered?

Conclusion

Science must be objective and not based upon ideas, however clear and distinct, as Descartes asserted in his 'Discours de la Méthode.'

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[18] M.R. Rampino and A. Prokoph, *"Are Mantle Plumes Periodic ?"* EOS Transactions American Geophysical Union, Vol. 94, No. 12, 2013, pp. 113-120, doi : 10.1002/2013EO120001.

[19] G. Berthault, *"Towards a Refoundation of Historical Geology"*, Georesources, 2012, pp. 4-36.

[20] G. Berthault, *"Orogenesis, cause of sedimentary formations"*, Open Journal of Geology, Vol.3, 2013, pp. 22-24.

[21] R. Dilly, G. Berthault, A. Lalomov, *"Orogenesis, cause of sedimentary formations"*, 8ème conference lithologique *"Evolution des processus sédimentaires dans l'histoire de la terre"*, Académie des Sciences et Université gouvernementale du pétrole et du gaz, Moscou (10/2015).

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A Diverting Digression of Infantile Inexactitudes

Mark Twain

Offering a light relief from our more solemn scientific and theological treatises, the following selection of 'schoolchild errors,' many related to Science, are taken from What is Man? and other essays *(Chatto & Windus, 1919) – available to download from www.gutenberg.org - Ed.* [1]

I have just now fallen upon a darling literary curiosity. It is a little book, a manuscript compilation, and the compiler sent it to me with the request that I say whether I think it ought to be published or not. I said, Yes; but as I slowly grow wise I briskly grow cautious; and so, now that the publication is imminent, it has seemed to me that I should feel more comfortable if I could divide up this responsibility with the public by adding them to the court. Therefore I will print some extracts from the book, in the hope that they may make converts to my judgment that the volume has merit which entitles it to publication.

As to its character. Every one has sampled "English as She is Spoke" and "English as She is Wrote"; this little volume furnishes us an instructive array of examples of "English as She is Taught"—in the public schools of—well, this country.[2] The collection is made by a teacher in those schools, and all the examples in it are genuine; none of them have been tampered with, or doctored in any way. From time to time, during several years, whenever a pupil has delivered himself of anything peculiarly quaint or toothsome in the course of his recitations, this teacher and her associates have privately set that thing down in a memorandum-book; strictly following the original, as to grammar, construction, spelling, and all; and the result is this literary curiosity.

You perceive that the poor little young idea has taken a shot at a good many kinds of game in the course of the book. Now as to results. Here are some quaint definitions of words. It will be noticed that in all of these instances the sound of the word, or the look of it on paper, has misled the child:

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[1] Title credit/blame – the Editor.
(See end of this text for a suggested reason for the common expression 'school***boy*** errors'!)

[2] i.e. the United States.

ABORIGINES, a system of mountains.
ALIAS, a good man in the Bible.
AMMONIA, the food of the gods.
ASSIDUITY, state of being an acid.
CAPILLARY, a little caterpillar.
CORNIFEROUS, rocks in which fossil corn is found.
CROSIER, a staff carried by the Deity.
EQUESTRIAN, one who asks questions.
EUCHARIST, one who plays euchre.
FRANCHISE, anything belonging to the French.
IDOLATER, a very idle person.
IRRIGATE, to make fun of.
MERCENARY, one who feels for another.
PARASITE, a kind of umbrella.
PLAGIARIST, a writer of plays.
PUBLICAN, a man who does his prayers in public.
REPUBLICAN, a sinner mentioned in the Bible.
SIBILANT, the state of being idiotic.
TENACIOUS, ten acres of land.

And here—with "zoological" and "geological" in his mind, but not ready to his tongue—the small scholar has innocently gone and let out a couple of secrets which ought never to have been divulged in any circumstances:

There are a good many donkeys in theological gardens.
Some of the best fossils are found in theological cabinets.

The chapter on “Mathematics” is full of fruit. From it I take a few samples—mainly in an unripe state:

A straight line is any distance between two places.
Parallel lines are lines that can never meet until they run together.
A circle is a round straight line with a hole in the middle.
Things which are equal to each other are equal to anything else.
To find the number of square feet in a room you multiply the room by the number of the feet. The product is the result.

In the matter of geography this little book is unspeakably rich.

America is divided into the Passiffic slope and the Mississippi valey.
North America is separated by Spain.
America consists from north to south about five hundred miles.
The United States is quite a small country compared with some other countrys, but is about as industrious.
The five seaports of the U.S. are Newfunlan and Sanfrancisco.
The principal products of the U.S. is earthquakes and volcanoes.
Mason and Dixon's line is the Equator.
In Austria the principal occupation is gathering Austrich feathers.
Gibraltar is an island built on a rock.
Russia is very cold and tyrannical.

Sicily is one of the Sandwich Islands.
Ireland is called the Emigrant Isle because it is so beautiful and green.
The imports of a country are the things that are paid for, the exports are the things that are not.
Climate lasts all the time and weather only a few days.
The two most famous volcanoes of Europe are Sodom and Gomorrah.

We come now to historical matters, historical remains, one might say. As one turns the pages he is impressed with the depth to which one date has been driven into the American child's head—1492. The date is there, and it is there to stay. And it is always at hand, always deliverable at a moment's notice. But the Fact that belongs with it? That is quite another matter. Only the date itself is familiar and sure: its vast Fact has failed of lodgment. It would appear that whenever you ask a public-school pupil when a thing—anything, no matter what—happened, and he is in doubt, he always rips out his 1492. He applies it to everything, from the landing of the ark to the introduction of the horse-car. Well, after all, it is our first date, and so it is right enough to honor it, and pay the public schools to teach our children to honor it:

George Washington was born in 1492.
Washington wrote the Declaration of Independence in 1492.
St. Bartholemew was massacred in 1492.
The Brittains were the Saxons who entered England in 1492 under Julius Caesar.
The earth is 1492 miles in circumference.

To proceed with “History” [a short sample here – Ed.]

Queen Isabella of Spain sold her watch and chain and other millinery so that Columbus could discover America.
The Indians pursued their warfare by hiding in the bushes and then scalping them.
Gorilla warfare was where men rode on gorillas.
Henry Eight was famous for being a great widower haveing lost several wives.
Lord James Gordon Bennet instigated the Gordon Riots.
The Middle Ages come in between antiquity and posterity.
Luther introduced Christianity into England a good many thousand years ago. His birthday was November 1883. He was once a Pope. He lived at the time of the Rebellion of Worms.
Julius Caesar was really a very great man. He was a very great soldier and wrote a book for beginners in the Latin.
The only form of government in Greece was a limited monkey.
Socrates... destroyed some statues and had to drink Shamrock.
By the Salic law no woman or descendant of a woman could occupy the throne.

Here are some results of study in music and oratory:

An interval in music is the distance on the keyboard from one piano to the next.
A rest means you are not to sing it.
Emphasis is putting more distress on one word than another.

The chapter on "Physiology" contains much that ought not to be lost to science:

Physillogigy is to study about your bones stummick and vertebry.
Occupations which are injurious to health are cabolic acid gas which is impure blood.
We have an upper and lower skin. The lower skin moves all the time and the upper skin moves when we do.
The body is mostly composed of water and about one half is avaricious tissue.
The stomach is a small pear-shaped bone situated in the body.
The gastric juice keeps the bones from creaking.
The Chyle flows up the middle of the backbone and reaches the heart where it meets the oxygen and is purified.
The salivary glands are used to salivate the body.
In the stomach starch is changed to cane sugar and cane sugar to sugar cane.
The olfactory nerve enters the cavity of the orbit and is developed into the special sense of hearing.
The growth of a tooth begins in the back of the mouth and extends to the stomach.
If we were on a railroad track and a train was coming the train would deafen our ears so that we couldn't see to get off the track.

[and some further (un)scientific silliness – Ed.]

The weight of the earth is found by comparing a mass of known lead with that of a mass of unknown lead.
To find the weight of the earth take the length of a degree on a meridian and multiply by 62 1/2 pounds.
The spheres are to each other as the squares of their homologous sides.
A body will go just as far in the first second as the body will go plus the force of gravity and that's equal to twice what the body will go.
Specific gravity is the weight to be compared weight of an equal volume of or that is the weight of a body compared with the weight of an equal volume.
The law of fluid pressure divide the different forms of organized bodies by the form of attraction and the number increased will be the form.
Inertia is that property of bodies by virtue of which it cannot change its own condition of rest or motion. In other words it is the negative quality of passiveness either in recoverable latency or insipient latescence.

There are several curious "compositions" in the little book, and we must make room for one. It is full of naivete, brutal truth, and unembarrassed directness, and is the funniest (genuine) boy's composition I think I have ever seen:

ON GIRLS

Girls are very stuck up and dignefied in their maner and be have your. They think more of dress than anything and like to

play with dowls and rags. They cry if they see a cow in a far distance and are afraid of guns. They stay at home all the time and go to church on Sunday. They

are al-ways sick. They are always funy and making fun of boy's hands and they say how dirty. They cant play marbels. I pity them poor

things. They make fun of boys and then turn round and love them. I dont beleave they ever kiled a cat or anything. They look out every nite and say oh ant the moon lovely. Thir is one thing I have not told and that is they al-ways now their lessons bettern boys.

"Male and female He created them" *Gen 1:27. Vive la différence!*

[Free-to-share illustrations added by Editor]

Daylight Origins Updates

By the Editor

Two new ebooks from the **Kolbe Center** www.kolbecenter.org

"If You Believed Moses, You Would Believe Me"
by Hugh Owen –
A Wake-Up Call for Catholics to Reject Satan's False "Science" and Trust God's Revelation
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"The Two Shall Become One":
The Creation of Adam and Eve as the Foundation of the Church's Teaching on Holy Marriage,
September 26, 2015, Rome, Italy
Pdf Transcript of Proceedings $10

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Michael Matt and Christopher Ferrara explore the Creation/Evolution debate from a sound Catholic perspective.

http://remnantnewspaper.com/web/index.php/remnant-tv-forum/item/1716-special-report-evolution-the-creation-narrative-of-atheists

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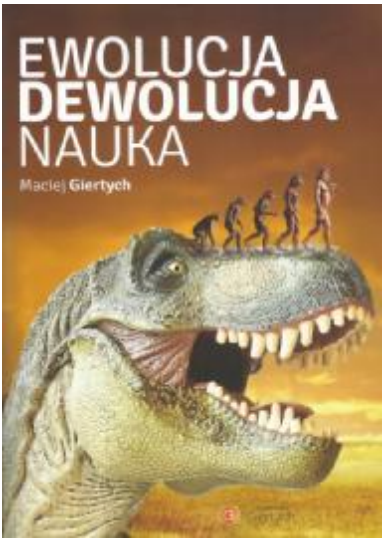

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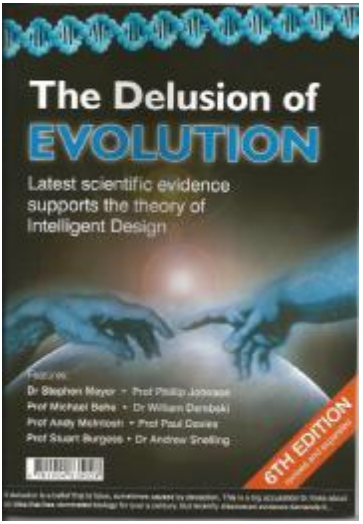

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Jean Henri Fabre

1823—1915

French entomologist – author of ten-volume Souvenirs entomologiques or Études sur l'Instinct et les Moeurs des Insects.

"In these times of overweening atheism, when so many pseudo-scientists are striving to persuade the ignorant that science is learning to dispense with God, would it not be a timely thing to reveal, to the eyes of all, a scientist of undoubted genius who finds in science fresh arguments for belief, and manifold occasions for affirming his faith in the God who has created and rules the world?"

[Fabre, A. (tr. B. Miall) *The Life of Jean Henri Fabre* (Hodder & Stoughton, 1910), p. xi]

"In his constant skirmishes against the theory of evolution, even in the set battles which he occasionally fights, whenever he writes Charles Darwin's name he mentions it with evident accents of respect and sympathy, gladly referring to him as 'the master,' 'the illustrious master,' 'the venerated master.'

"On his part the English scientist does full justice to the French scientist's incomparable mastery in the study of insects. We have mentioned the title of 'incomparable observer,' which he gives him in his work on the *Origin of Species*. In a letter dated the 16th of April 1881, he wrote to Mr. Romanes, who was preparing a book on *Animal Intelligence*: 'I do not know whether you would care to discuss in your book some of the more complicated and marvellous instincts. It is am ungrateful task … But if you discuss some of these instincts, it seems to me that you could not take a more interesting point than that of the animals that paralyse their prey, as Fabre has described in his astonishing memoir in the *Annales de sciences naturelles*, a memoir which he has since amplified in his admirable *Souvenirs*.'"

[ibid., p. 215-6]

[6th edition of *Origin* (p. 64) uses the words "inimitable observer"]

Kallima inachis butterfly—From J. Arthur Thomson *The Wonder of Life* (Andrew Melrose, 1916), p. 32

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