Jad >

Attribution

***The Arnold Principle.* If a notion bears a personal name, then this name is not the name of the discoverer.**
***The Berry Principle.* The Arnold Principle is applicable to itself.**

- http://en.wikipedia.org/wiki/The_Nine_Chapters_on_the_Mathematical_Art
  - BC chinese, Gaussian reduction, Pythagora's Theorem

- Gaussian elimination
  - The method of Gaussian elimination appears in Chapter Eight, *Rectangular Arrays*, of the important Chinese mathematical text *Jiuzhang suanshu* or *The Nine Chapters on the Mathematical Art*. Its use is illustrated in eighteen problems, with two to five equations. The first reference to the book by this title is dated to 179 CE, but parts of it were written as early as approximately 150 BCE.[1] It was commented on by Liu Hui in the 3rd century.

    The method in Europe stems from the notes of Isaac Newton.[2][3] In 1670, he wrote that all the algebra books known to him lacked a lesson for solving simultaneous equations, which Newton then supplied. Cambridge University eventually published the notes as *Arithmetica Universalis* in 1707 long after Newton left academic life. The notes were widely imitated, which made (what is now called) Gaussian elimination a standard lesson in algebra textbooks by the end of the 18th century. Carl Friedrich Gauss in 1810 devised a notation for symmetric elimination that was adopted in the 19th century by professional hand computers to solve the normal equations of least-squares problems. The algorithm that is taught in high school was named for Gauss only in the 1950s as a result of confusion over the history of the subject.

  - The Chinese, between 200 BC and 100 BC, came much closer to matrices than the Babylonians. Indeed it is fair to say that the text Nine Chapters on the Mathematical Art written during the Han Dynasty gives the first known example of matrix methods. First a problem is set up which is similar to the Babylonian example given above:-

    There are three types of corn, of which three bundles of the first, two of the second, and one of the third make 39 *measures. Two of the first, three of the second and one of the third make* 34 *measures. And one of the first, two of the second and three of the third make* 26 *measures. How many measures of corn are contained of one bundle of each type?*

    Now the author does something quite remarkable. He sets up the coefficients of the system of three linear equations in three unknowns as a table on a 'counting board'.

1	2	3
2	3	2
3	1	1
26	34	39

Our late 20th Century methods would have us write the linear equations as the rows of the matrix rather than the columns but of course the method is identical. Most remarkably the author, writing in 200 BC, instructs the reader to multiply the middle column by 3 and subtract the right column *as many times as possible*, the same is then done subtracting the right column *as many times as possible* from 3 times the first column. This gives

0	0	3
4	5	2
8	1	1
39	24	39

Next the left most column is multiplied by 5 and then the middle column is subtracted *as many times as possible*. This gives

0	0	3
0	5	2
36	1	1
99	24	39

from which the solution can be found for the third type of corn, then for the second, then the first by back substitution. This method, now known as Gaussian elimination, would not become well known until the early 19th Century.

- http://www-history.mcs.st-and.ac.uk/HistTopics/Matrices_and_determinants.html

Henry Wilbraham (July 25, 1825 – February 13, 1883) was an English mathematician. He is known for discovering and explaining the Gibbs phenomenon nearly fifty years before J. Willard Gibbs did. Gibbs and Maxime Bôcher, as well as nearly everyone else, were unaware of Wilbraham's work on the Gibbs phenomenon.

Historically, the cross product was defined (separately) by Josiah Willard Gibbs and Oliver Heaviside as a portion of the quaternion product, useful for physical applications (such as Maxwell's theory of electromagnetism). The other portion was the dot product, **u**·**v**. This partition was highly controversial at the time, but all three products have proved useful. In terms of the two partial products, the quaternion product of two vectors [**u**, 0] and [**v**, 0] is [**u**×**v**, −**u**·**v**].

Newton - Hooke: http://physics.ucsc.edu/~michael/ (Michael Nauenberg)

About the Euler-Rodrigez forumula. "In a footnote about this eponymic designation, Goldstein [1], states that Hamel (Theoretische Mechanik, p. 103) ascribes this theorem to the French mathematician O. Rodrigues (1794-1851), but Goldstein claims this might be an error, suggesting that Gibbs was the first to put it in vector form (Vector Analysis, p. 338). The underlying formula is apparently much older still."   (source Rebecca Brannon, rotations.pdf)

In its chapter 8 he (Rodrigues) describes most clearly, without a figure, a geometrical construction which, given the angles and axes of two successive rotations, determines the orientation of the resultant axis or rotation and the geometrical value of the angle of rotation. This construction is usually called in the literature the Euler Constuction, although Euler had nothing to do with it. ('Hamilton Rodrigues and the Quaternion Scandal' by Altmann)

we must mention that the (four) rotation parameters in (21) are called the Euler-Rodriques parameters in the literature. The reasons for this are entirely disreputable (see [1, p.20)], since Euler never came near them: in particular, he never used half-angles which , as demonstrated by Rodrigues, are an essential feature of the parametrization of rotations. ('Hamilton Rodrigues and the Quaternion Scandal' by Altmann)

Germans call this mechanism "Cardan's joint" (from the 16th century) while the British use "Hooke's joint," attributed to Robert Hooke (1676). In the United States it is called a "universal joint." It is used in the transmissions of automobiles to convert motion about one axis to motion about another nonparallel axis.

(The road to reality, Penrose)

This appears to have applied even to the great Gauss himself (who had, on the other hand, very frequently anticipated other mathematicians' work). There is an important topological mathematical theorem now referred to as the 'Gauss– Bonnet theorem', which can be elegantly proved by use of the so-called 'Gauss map', but the theorem itself appears actually to be due to Blaschke and the elegant proof procedure just referred to was found by Olinde Rodrigues. It appears that neither the result nor the proof procedure were even known to Gauss or to Bonnet. There is a more elemental 'Gauss–Bonnet' theorem, cor- rectly cited in several texts, see Willmore (1959), also Rindler (2001).

Not exactly a mis-attribution but still nice

"A common misconception is that analytic geometry was invented by Descartes. At least it is a misconception if we by analytic geometry mean drawing perpendic- ular coordinate axes and choosing an interval to serve as unit, so as to establish a one-to-one correspondence between the points of the plane and ordered pairs of real numbers."

(http://www2.math.uu.se/~thomase/GeometryoverFields.pdf) (FROM GEOMETRY TO NUMBER The Arithmetic Field implicit in Geometry Johan Alm)

Newton's method

Newton's method was described by Isaac Newton in *De analysi per aequationes numero terminorum infinitas* (written in 1669, published in 1711 by William Jones) and in *De metodis fluxionum et serierum infinitarum* (written in 1671, translated and published as *Method of Fluxions* in 1736 by John Colson). However, his description differs substantially from the modern description given above: Newton applies the method only to polynomials. He does not compute the successive approximations x_n, but computes a sequence of polynomials and only at the end, he arrives at an approximation for the root *x*. Finally, Newton views the method as purely algebraic and fails to notice the connection with calculus. Isaac Newton probably derived his method from a similar but less precise method by Vieta. The essence of Vieta's method can be found in the work of the Persian mathematician, Sharaf al-Din al-Tusi, while his successor Jamshīd al-Kāshī used a form of Newton's method to solve $x^P - N = 0$ to find roots of *N* (Ypma 1995). A special case of Newton's method for calculating square roots was known much earlier and is often called the Babylonian method.

Newton's method was used by 17th century Japanese mathematician Seki Kōwa to solve single-variable equations, though the connection with calculus was missing.

Newton's method was first published in 1685 in *A Treatise of Algebra both Historical and Practical* by John Wallis. In 1690, Joseph Raphson published a simplified description in *Analysis aequationum universalis*. Raphson again viewed Newton's method purely as an algebraic method and restricted its use to polynomials, but he describes the method in terms of the successive approximations x_n instead of the more complicated sequence of polynomials used by Newton. Finally, in 1740, Thomas Simpson described Newton's method as an iterative method for solving general nonlinear equations using fluxional calculus, essentially giving the description above. In the same publication, Simpson also gives the generalization to systems of two equations and notes that Newton's method can be used for solving optimization problems by setting the gradient to zero.

Arthur Cayley in 1879 in *The Newton-Fourier imaginary problem* was the first who noticed the difficulties in generalizing the Newton's method to complex roots of polynomials with degree greater than 2 and complex initial values. This opened the way to the study of the theory of iterations of rational functions.

http://en.wikipedia.org/wiki/List_of_misnamed_theorems

Kleinian Functions

Mittag-Leffler got the long pa- pers he wanted in which Poincaré set out the theory of the new functions, and Klein had to realise that the younger, less well- educated Poincaré was moving faster than he ever could. Their exchanges are both scholarly and personal. Klein objected to the name 'Fuchsian' for the new functions on the grounds that some ideas of Schwarz were much closer, and Poincaré agreed when he got round to consulting Schwarz's paper, which he had not known. But he could not agree to change the name, which he had al- ready used in publications, and Klein railed against this, doubtless because Fuchs, as a Berlin-trained mathematician close to Weier- strass and Kummer, was a rival likely to have a better career than him but with less talent. To shut him up Poincaré named the general- isation of Fuchsian functions that require 3- dimensional non-Euclidean geometry 'Kleini- an functions'. Klein protested, correctly, that he had had nothing to do with these func- tions and Schottky's name would be more appropriate; "Name ist Schall und Rauch" Poincaré replied in German ("Name is sound and fury", the quotation comes from Gretchen in Goethe's Faust). (Poincaré and the idea of a group, Gray)

Cayley and matrices.

For convenience I shall refer to this interpretation of the history of matrix theory as the Cayley-as-Founder view. It is a very simplistic interpretation which, as I will indicate, does not make much historical sense. The history of the theory of matrices is much more complex than the Cayley-as-Founder view would imply. Indeed its history is truly international in scope (The Theory of Matrices in the 19th Century, Hawkins)

sampling theorem.

1948/49: Shannon, referring to the works of J. M. Whittaker and Nyquist, presents and proves the now well-known sampling theorem.
Later it became known that similar or even fully equivalent theorems had been published earlier by Ogura (1920), Kotel'nikov (1933, in Russian), and Raabe (1939, in German), and around the same time as Shannon by Someya (1949, in Japanese), and Weston (1949).
(http://www.imagescience.org/meijering/research/chronology/)

Euler on Calculus attributions

"We find among some ancient authors some trace of these ideas, so that we cannot deny to them at least some conception of the analysis of the infinite. Then gradually this knowledge grew, but it was not all of a sudden that it has arrived at the summit to which it has now come. Even now, there is more that remains obscure than what we see clearly. As differential calculus is extended to all kinds of functions, no matter how they are pro-duced, it is not immediately known what method is to be used to compare the vanishing increments of absolutely all kinds of functions. Gradually this discovery has progressed to more and more complicated functions. For example, for the rational functions, the ultimate ratio that the vanishing increments attain could be assigned long before the time of Newton and Leibniz, so that the differential calculus applied to only these rational func- tions must be held to have been invented long before that time. However, there is no doubt that Newton must be given credit for that part of differ- ential calculus concerned with irrational functions. This was nicely deduced from his wonderful theorem concerning the general evolution of powers of a binomial. By this outstanding discovery, the limits of differential calculus have been marvelously extended. We are no less indebted to Leibniz insofar as this calculus at that time was viewed as individual tricks, while he put it into the form of a discipline, collected its rules into a system, and gave a crystal-clear explanation. From this there followed great aids in the further development of this calculus, and some of the open questions whose an- swers were sought were pursued through certain definite principles. Soon, through the studies of both Leibniz and the Bernoullis, the bounds of dif- ferential calculus were extended even to transcendental functions, which had in part already been discussed. Then, too, the foundations of integral calculus were firmly established. Those who followed in the elaboration of this field continued to make progress. It was Newton who gave very com- plete papers in integral calculus, but as to its first discovery, which can hardly be separated from the beginnings of differential calculus, it cannot with absolute certainty be attributed to him. Since the greater part has yet to be developed, it is not possible to say at this time that this calculus has absolutely been discovered. Rather, let us with a grateful mind acknowl- edge each one according to his efforts toward its completion. This is my judgment as to the attribution of glory for the discovery of this calculus, about which there has been such heated controversy." (Euler, in Blanton's translation of Institutiones calculi differentialis)

"This is probably why it is nowadays usually referred to as the Gregory-Newton formula. There is reason to suspect, however, that Newton must have been familiar with Briggs' works [105]." (A Chronology of Interpolation, Meijering)

"A very elegant alternative representation of Newton's general formula (6) that does not require the computation of finite or divided differences was published in 1779 by Waring [344], and reads:....
it is nowadays usually attributed to Lagrange, who, in apparent ignorance of Waring's paper, published it 16 years later [180]. The formula may also be obtained from a closely related representation of Newton's formula due to Euler [90]. According to Joffe [157], it was Gauss who first noticed the logical connection and proved the equivalence of the formulae by Newton, Euler, and Waring-Lagrange, as appears from his posthumous works [110], although Gauss did not refer to his predecessors." (A Chronology of Interpolation, Meijering)

More Euler-Rodrigues

"In a footnote about this eponymic designation, Goldstein [1], states that Hamel (Theoretische Mechanik, p. 103) ascribes this theorem to the French mathematician O. Rodrigues (1794-1851), but Goldstein claims this might be an error, suggesting that Gibbs was the first to put it in vector form (Vector Analysis, p. 338). The underlying formula is apparently much older still." (Brannon, Rotation.pdf)

"
We now look at some of Levi's contributions to astronomy. One of these is associated with astronomical instruments. He invented Jacob's staff, an instrument to measure the angular distance between celestial objects. We should note that the term 'Jacob's staff' was not used by Levi but rather by his Christian contemporaries; he used a Hebrew name which translates as 'Revealer of Profundities'. It is described as consisting:-

... of a staff of 41/2 feet long and about one inch wide, with six or seven perforated tablets which could slide along the staff, each tablet being an integral fraction of the staff length to facilitate calculation, used to measure the distance between stars or planets, and the altitudes and diameters of the Sun, Moon and stars. " (http://www-history.mcs.st-andrews.ac.uk/Biographies/Levi.html)

Newton's Cradle.

(http://en.wikipedia.org/wiki/Newton%27s_cradle)
"The principle demonstrated by the device, the law of impacts between bodies, was first demonstrated by the French physicist Abbé Mariotte in the 17th century.[9] [10] Newton acknowledged Mariotte's work, among that of others, in his Principia."

"Christiaan Huygens used pendulums to study collisions. His work, De Motu Corporum ex Percussione (On the Motion of Bodies by Collision) published posthumously in 1703, contains a version of Newton's first law and discusses the collision of suspended bodies including two bodies of equal size with the motion of a moving body being transferred to one at rest."

"There is much confusion over the origins of the modern Newton's cradle. Marius J. Morin has been credited as being the first to name and make this popular executive toy. However, in early 1967, an English actor, Simon Prebble, coined the name "Newton's cradle" (now used generically) for the wooden version manufactured by his company, Scientific Demonstrations Ltd. After some initial resistance from retailers, they were first sold by Harrods of London, thus creating the start of an enduring market for executive toys. Later a very successful chrome design for the Carnaby Street store Gear was created by the sculptor and future film director Richard Loncraine."

'You get used to it'

(http://en.wikiquote.org/wiki/John_von_Neumann)
Young man, in mathematics you don't understand things. You just get used to them.
Reply to Dr. Felix T. Smith at Stanford Research Institute who had said "I'm afraid I don't understand the method of characteristics." —as quoted in footnote of pg 208, in The Dancing Wu Li Masters: An Overview of the New Physics (1984) by Gary Zukav.

Versus:
'halmos: I never understood epsilon-delta analysis, I just got used to it.' from 'I want to be a Mathematician'

L'hopital's rule.

(Elements d'histoire des mathematiques, Bourbaki)
La distinction entre les « infiniment petits » (ou « infiniment grands ») de divers ordres, apparaît implicitemeat dès les premiers écrits sur le Calcul différentiel, et par exemple dans'ceux de Fermat ; elle devient pleinement consciente chez Newton et Leibniz, avec la théorie des « différences d'ordre supérieur » ; et on ne tarde pas à observer que, dans les cas les plus simples, la limite (ou « vraie valeur ») d'une expression de la forme f(x)/g(x), en un point où f et g tendent toutes deux vers 0, est donnée par le développement de Taylor de ces fonc- tions au voisinage du point considéré (« règle de l'Hôpital »,due vrai- semblablement à Johann Bernoulli).

Moebius strip.

According to the book "Unkown Quantity" p.280, this should be properly attributed to Johann Listing, with a four year precedence.

Euclidean Algorithm.

" The method of finding a common measure of two line segments a0,a1 had already been practiced, before the days of Greek philosophy and science, by craftsmen, by a process of alternate "taking away." Euclid described the process in his Elements which now goes by the name of the Euclidean algorithm.The smaller segment a1 is taken away from the larger segment a0 as many times as possible, until the residue left is smaller than a1, so that , if a2 is this residue, then ..." (Numbers, Ebbinghaus et al).

Irrationality of sqrt(2)

'However,the irrationality of sqrt(2) was certainly known before Euclid. According to PLATO(Theaetefts147d) the irrationality of certain square rots such as ... had been demonstrated earlier by Theodorus of CYRENE. In Plato's Laws (819d—820c) there is a pasage where the Athe- nian stranger speaks of the shameful ignorance of the generality of Greks who are unaware that not al geometrical quantities are comensurable with one another and ads that it was only late (in life, or posibly late in the day) that he himself learned the truth. (Se HEATH'S History of Grek Mathematics, p. 156.)' (Numbers, Ebbinghaus et al).

Stoke's Theorem.

The excellent Katz starts with: 'Let us give credit where credit is due: Theorems of Green, Gauss and Stokes appeared unheralded in earlier work' in 'The History of Stoke's theorem'

Dirac delta:

Attribution: cauchy dirac function: who gave you the... Katz

Cantor's set.

In [THE CONVERSE OF THE INTERMEDIATE VALUE THEOREM: FROM CONWAY TO CANTOR TO COSETS AND BEYOND], we read: "Despite the moniker, the Cantor sets were first discovered in the 1870s by Henry Smith; see Smith [16]", with

> [16]. H. Smith, On the integration of discontinuous functions, Proc. London Math. Soc. 1
>
> (1874), no. 6, 140–153.

Von Neumann universe

"The cumulative type hierarchy, also known as the von Neumann universe, is claimed by Gregory H. Moore (1982) to be inaccurately attributed to von Neumann.[14]The first publication of the von Neumann universe was by Ernst Zermelo in 1930." (https://en.wikipedia.org/wiki/Von_Neumann_universe)

Currying is in fact Schoenfinkelisation

"Along the way, Sch¨onfinkel pointed out that multi-variable applications such as F(x,y) could be replaced by successive single applications (f(x))(y), where f was a function whose output-value f(x) was also a function, see [Sch¨onfinkel, 1924, §2]. This replacement-process is now known in the computer-science community as "currying", from its use in the work of Haskell Curry; although Curry many times attributed it to Sch¨onfinkel, for example in [Curry, 1930, p.512] and [Curry and Feys, 1958, pp. 8, 11, 30, 106], and it was used even earlier by Frege, [Frege, 1893, Vol.1 §4]." [History of Lambda-calculus and Combinatory Logic
Felice Cardone ∗ J. Roger Hindley]

'Karcher means' are not due to Karcher. In fact, Karcher himself authored an arxiv paper (Riemannian Center of Mass and so called karcher mean) to clarify the haphazard attribution!
(This misattribution is courtesy of Teodor Cioaca, whom we thank)

Great but not famous section

Origin of ||A|| notation for cardinality, comes from the double abstraction definition by Cantor as explained in Encyclopedia of Mathematics Vol2,C, and in Alexandroff's Mengenlehre. Cantor used two small bars on top of A, abstracting qualitative properties of elements and their order.

Great but not famous section

Meray.

" Robinson writes in [1]:-

In his time he was a respected but not a leading mathematician. Méray is remembered for having anticipated, clearly and with only minor differences of style, Cantor's theory of irrational numbers, one of the main steps in the arithmetisation of analysis.

So here we have a case of a mathematician who produced work which might have made him one of the leading mathematicians in the world. However, as happened many times throughout history, Méray was unlucky for the genius of his work was not recognised at the time. Others (we give details below) published the same ideas and it would be their work rather than that of Méray which influenced the direction of mathematics. All we can do now is to give Méray the credit he deserves for his remarkable work, even if fate did not allow Méray a role of importance in the development of the subject.

In 1869 Méray was the first to publish an arithmetical theory of irrational numbers in his paper Remarques sur la nature des quantités définies par la condition de servir de limites à des variables données. Others such as Martin Ohm (1829), Bolzano (1835) and Hamilton (1833) had published work on irrational numbers but none of these earlier authors gave a rigorous account. Méray's is the earliest coherent and rigorous theory of the irrational numbers to appear in print. His work was not influenced by Weierstrass (whose work was unpublished) or Dedekind who only published his theories after Cantor's important paper appeared in 1872. Méray followed Lagrange's earlier work but gave rigorous proofs of what Lagrange had only conjectured.

Méray published a second important work in 1872. This work is a book Nouveau précis d'analyse infinitésimale which aims to present the theory of functions of a complex variable using power series. It is another rigorous work and in fact between 1872 and 1894 Méray produced a series of papers which remove geometric considerations from analytic proofs. Méray's work consistently follows Lagrange in basing the whole of analysis on the concept of functions written as Taylor series.

We have noted above that Méray's work had no real influence on the development of mathematics despite being almost exactly the same as the work which would transform the direction of mathematics. It was not that Méray's work went unnoticed. His 1872 book Nouveau précis d'analyse infinitésimale was reviewed by Hermann Laurent in

1873. Hermann Laurent, in his review, ignored Méray's irrational numbers [1]:-

... while gently chiding the author for using too narrow a notion of a function and for being too rigorous in a supposed textbook. At that time there was not in France - as there was in Germany - a sufficient appreciation of the kind of problem considered by Méray, and not until much later was it realised that he had produced a theory of a kind that had added lustre to the names of some of the greatest mathematicians of the period.

" (http://www-groups.dcs.st-and.ac.uk/history/Biographies/Meray.html)

http://en.wikipedia.org/wiki/Simon_Stevin

A lot of reasons, including

According to van der Waerden (1985, p. 69), Stevin's "general notion of a real number was accepted, tacitly or explicitly, by all later scientists". A recent study attributes a greater role to Stevin in developing the real numbers than has been acknowledged by Weierstrass's followers.[11] Stevin proved the intermediate value theorem for polynomials, anticipating Cauchy's proof thereof. Stevin uses a divide and conquer procedure subdividing the interval into ten equal parts.[12] Stevin's decimals were the inspiration for Isaac Newton's work on infinite series.[13]"

Pierre Alphonse Laurent (July 18, 1813 – September 2, 1854) was a French mathematician best known as the discoverer of the Laurent series, an expansion of a function into an infinite power series, generalizing the Taylor series expansion. He was born in Paris, France. His result was contained in a memoir submitted for the Grand Prize of the Académie des Sciences in 1843, but his submission was after the due date, and the paper was not published and never considered for the prize. Laurent died at age 41 in Paris. His work was not published until after his death.

According to Emmert in 'The Theory of Complex Functions', his work is extremely important.

Percy John Daniell.

"According to John Aldrich, the theorem was independently discovered by British mathematician Percy John Daniell in the slightly different setting of integration theory.[3]" (https://en.wikipedia.org/wiki/Kolmogorov_extension_theorem)

"While Fisher (1922) can be interpreted as the last stage in a struggle to escape from “inverse probability” and from what he had been taught as an undergraduate–see Aldrich (1997, 2006a)–no such ghosts are lurking in Daniell (1920c)."

'J. Aldrich, But you have to remember PJ Daniell of Sheffield, Electronic Journal for History of Probability and Statistics, Vol. 3, number 2, 2007'
(http://www.emis.de/journals/JEHPS/Decembre2007/Aldrich.pdf)

Poor and uncredited section

Heuraet and hints to FTC

"The first of these integrals represents an arc length, whereas the second stands for the area under a parabola. Today, we just look at these as two simple integration problems, but in the old days B(efore) C(alculus), these were viewed as two separate kinds of problems.
Heuraet's method was entirely general. When Newton saw the proof, he realized the value of trans- forming one type of problem into another. This is one of the roots of the Fundamental Theorem of Calculus. It is the biggest swap of all|we trade integration for anti-differentiation. This is precisely what Newton did soon after he read Heuraet's proof" [Scherlock in Babylon, Anderson, Katz, Wilson]