The So-Called Euler-Diderot Incident

Author(s): R. J. Gillings

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THE SO-CALLED EULER-DIDEROT INCIDENT

R. J. GILLINGS, Sydney University, Australia

1. Introductory Notes. Peter I or Peter the Great, the first emperor of Russia, died in 1725 and was succeeded by his wife Catherine I. She reigned only two years, being followed by Peter II who died in 1730. Then came in relatively quick succession, Anne, daughter of Peter's half-brother, 1730–40; Ivan VI, grand-nephew of Anne, 1740–41; Elizabeth, daughter of Peter and Catherine I, 1741–61; Peter III, grandson of Peter, 1761–62; and Catherine II who reigned the 34 years from 1762 to 1796.

Catherine II is by some historians referred to as Catherine the Great, while others deny her the right to that title. However she was a woman of culture who respected the arts generally, encouraged men of letters, and who herself displayed ability as a writer.

Denis Diderot (1713–84) was a distinguished philosopher, an encyclopaedist, and an author of many scientific publications, who visited St. Petersburg in 1773–74 since the Empress Catherine II had purchased his library and appointed him its first librarian. The following mathematical memoirs of Diderot published in 1784, among others, are discussed by L. G. Krakuer and R. L. Krueger, [1]: "Sur la tension des cordes," "De la developpante du cercle," "Résistance de l'air au mouvements des pendules"; and in J. L. Coolidge's, *The Mathematics of Great Amateurs*, Oxford, 1949, ch. XIV, Diderot's treatment of "vibrating strings" is discussed, together with those mentioned above. Diderot, who had been in turn, a deist, a pantheist, a sceptic and finally an atheist, was then verging on 60 years of age, Catherine was 44 and Euler was 66.

Leonard Euler (1707–83), famous mathematician, was invited to St. Petersburg in 1727, to accept the chair of mathematics at the Academy recently founded by Peter the Great. Here he remained until 1741, when he was induced by Frederic the Great of Prussia to spend 25 years in Berlin until 1766, when he returned to St. Petersburg at the request of Catherine II, and worked there until the end of his life.

Dieudonné Thiébault (1733–1807) was a French man of letters who for the period from 1765 to 1784, lived in Berlin at the invitation of Frederic the Great. He was a member of the Berlin Royal Academy. The incident to which this paper refers had its origin in Thiébault's reminiscences of his twenty years sojourn in Berlin.

2. De Morgan's Statement. [2]. "The following anecdote is found in Thiébault's *Souvenirs de vingt ans de séjour à Berlin*, published in 1804. Thiébault does not claim personal knowledge of the anecdote, but he vouches for its being received as true all over the north of Europe. Diderot paid a visit to Russia at the invitation of Catherine the Second. At that time he was an atheist or at least talked atheism: it would be easy to prove him one thing or the other from his writings. His lively sallies on this subject much amused the Empress,

and all the younger part of her Court. But some of the older courtiers suggested that it was hardly prudent to allow such unreserved exhibitions. The Empress thought so too, but did not like to muzzle her guest by an express prohibition: so a plot was contrived. The scorner was informed that an eminent mathematician had an algebraical proof of the existence of God, which he would communicate before the whole Court, if agreeable. Diderot gladly consented. The mathematician, who is not named, was Euler. He came to Diderot with the gravest air, and in a tone of perfect conviction said, '*Monsieur*! $(a+b^n)/n=x$, *donc Dieu existe*; *répondez*!' Diderot, to whom algebra was Hebrew, though this is expressed in a very roundabout way by Thiébault—and whom we may suppose to have expected some verbal argument of alleged algebraical closeness, was disconcerted, while peals of laughter sounded on all sides. Next day he asked permission to return to France, which was granted."

3. Cajori's Statement. [3]. "The story goes that when the French philosopher Denis Diderot paid a visit to the Russian Court, he conversed very freely and gave the younger members of the Court circle a good deal of lively atheism. Thereupon Diderot was informed that a learned mathematician was in possession of an algebraical demonstration of the existence of God, and would give it to him before all Court, if he desired to hear it. Diderot consented. Then Euler advanced towards Diderot, and said gravely, and in a tone of perfect conviction: '*Monsieur*, $(a+b^n)/n=x$, *donc Dieu existe*; *répondez*!' Diderot, to whom algebra was Hebrew, was embarrassed and disconcerted, while peals of laughter rose on all sides. He asked permission to return to France at once, which was granted." [A reference is then given to De Morgan's *Budget of Paradoxes.*]

4. Bell's Statement. [4]. "We shall tell once more the famous story of Euler and the atheistic (or perhaps only pantheistic) French philosopher Denis Diderot (1713–1784). Invited by Catherine the Great to visit her Court, Diderot earned his keep by trying to convert the courtiers to atheism. Fed up, Catherine commissioned Euler to muzzle the windy philosopher. This was easy because all mathematics was Chinese to Diderot. De Morgan tells what happened (in his classic *Budget of Paradoxes*, 1872): Diderot was informed that a learned mathematician was in possession of an algebraical demonstration of the existence of God, and would give it before all the Court, if he desired to hear it. Diderot gladly consented . . . Euler advanced towards Diderot, and said gravely, and in a tone of perfect conviction: '*Sir*, $(a+b^n)/n=x$, *hence God exists*; *reply*!' It sounded like sense to Diderot. Humiliated by the unrestrained laughter which greeted his embarrassed silence, the poor man asked Catherine's permission to return at once to France. She graciously gave it. Not content with this masterpiece, Euler in all seriousness painted his lily with solemn proofs, in deadly earnest, that God exists and that the soul is not a material substance. It is reported that both proofs passed into the treatises on theology of his day."

5. Hogben's Statement. [5]. "There is a story about Diderot, the Encyclo-

paedist, and materialist, a foremost figure in the intellectual awakening which immediately preceded the French Revolution. Diderot was staying at the Russian court, where his elegant flippancy was entertaining the nobility. Fearing that the faith of her retainers was at stake, the Tsaritsa commissioned Euler, the most distinguished mathematician of the time, to debate with Diderot in public. Diderot was informed that a mathematician has established a proof of the existence of God. He was summoned to court without being told the name of his opponent. Before the assembled court, Euler accosted him with the following pronouncement, which was uttered with due gravity: '$(a+b^n)/n=x$, *donc Dieu existe, répondez*!' Algebra was Arabic to Diderot. Unfortunately he did not realise that was the trouble. . . . Translated freely into English it may be rendered: 'A number x can be got by first adding a number a to a number b multiplied by itself a certain number of times, and then dividing the whole by the number of b's multiplied together. . . .' Like many of us Diderot had stage-fright when confronted by a sentence in size language. He left the court abruptly amid the titters of the assembly, confined himself to his chambers, demanded a safe conduct, and promptly returned to France."

6. Thiébault's Statement. [6]. An English translation of the relevant passage is as follows: From the moment of his arrival Diderot was well received, all his expenses had been paid by the Empress whom he amused immensely by the fecundity and fire of his imagination, by the abundance and singularity of his ideas, and by the zeal, boldness and eloquence with which he publicly upheld atheism. But several of the older courtiers more experienced and perhaps more easily alarmed, persuaded their autocratic sovereign that teachings of this kind could have unfortunate consequences for the whole court, and especially among the large youthful group, destined for important empire posts, who might embrace this doctrine with more eagerness than careful scrutiny. The Empress then desired that some restraint be put upon Diderot on this subject, provided that she did not appear to play any part in the matter, and provided that no one should show any undue authority about it. It was therefore announced to the French philosopher one evening, that a Russian philosopher, a learned mathematician and a distinguished member of the Academy, was prepared to prove the existence of God to him, algebraically, and before the whole court. Diderot said that he would be happy to listen to such a demonstration, in the validity of which of course, he did not believe, and so an hour and a day were fixed to convince him. The occasion having arrived, with the whole court present, that is to say, the men and more particularly the younger members, the Russian philosopher gravely advanced towards the French philosopher, and speaking in a tone of voice to imply his full conviction, said, "*Monsieur*, $(a+b^n)/z=x$, [7] *therefore God exists*: *answer that*!" Diderot was willing to show the futility and stupidity of this so-called proof, but felt in spite of himself, the embarrassment that one would, on discovering, (among them), their intention of making a game of it, so that he was not disposed to attempt to admonish them

for the indignities proposed for him. This adventure made him fearful that there might be others in store for him of a like nature, and so sometime afterwards he expressed his desire to return to France. Then the Empress having declared her willingness to pay all his traveling expenses, he was sent on his journey after having received 50,000 francs. Eventually his carriage was wrecked near Riga, but he received from the governor of that town the whole of the cost of the repairs. I do not assert the truth of any one of these facts; I say only, that at that time, they were talked about, and were believed by the inhabitants of the north.

7. Conclusions. Since Thiébault's statement is the only authority for the facts discussed in this incident we may now summarize some of the unwarranted changes made by the authors mentioned. We see that De Morgan's statement makes more than one departure from his quoted authority: "Algebra was Hebrew" . . . (see also the facts given in the Introductory Notes), "Diderot . . . was disconcerted while peals of laughter sounded on all sides," "Next day he asked permission to return to France," and "The mathematician who was not named was Euler." We grant that Thiébault's phrase, "a Russian philosopher, a learned mathematician and a distinguished member of the academy," seems rather definitely to refer to the Swiss Mathematician Euler.

De Morgan's inventions are naturally repeated by Cajori. Bell also repeats them but substitutes "All mathematics was Chinese to Diderot," for "Algebra was Hebrew to Diderot." No authority is given for Bell's statements in his final two sentences, hence we question the adequacy of that authority.

It will be observed that Hogben also alters the form of De Morgan's inventions. Struik has well pointed out [8] the incongruity of the story, which is completely out of character both for the devout Euler and the highly intelligent Diderot. Thiébault himself was not convinced of the truth of it. The extent to which legendary stories of history may be distorted is well illustrated by the so-called Euler-Diderot incident.

References

1. L. G. Krakuer and R. L. Krueger, *Isis*, vol. 33, 1941, p. 219–231.

2. A. De Morgan, *A Budget of Paradoxes*. London, 1872, p. 250 and p. 474. The story appears twice.

3. F. Cajori, *A History of Mathematics*. New York, 1919, p. 233. Second edition revised and enlarged.

4. E. T. Bell, *Men of Mathematics*. New York, 1937, p. 146–147.

5. L. Hogben, *Mathematics for the Millions*. New York, 1951, p. 17. Opening paragraph of chapter I.

6. D. Thiébault, *Mes Souvenirs de Vingt Ans de Sêjour à Berlin*. Paris, 1804, 3 vols. The passage is on page 141 of volume 3. The English translation published in 1806 in 2 volumes at Philadelphia, under the title of, *Anecdotes of Frederick the Great of Prussia*, makes no mention of this story.

7. The formula is printed in italics and the z of the denominator could possibly be mistaken for a 2. It is however "z" clearly enough and not "n" as De Morgan miscopied it and following him, Cajori, Bell, Smith, Sanford, Hogben and others.

8. D. J. Struik, *A Concise History of Mathematics*. New York, 1948, p. 182.