

= The Number Devil =

The Number Devil : A Mathematical Adventure ( German : Der Zahlenteufel . Ein Kopfkissenbuch für alle , die Angst vor der Mathematik haben ) is a book for children and young adults that explores mathematics . It was originally written in 1997 in German by Hans Magnus Enzensberger and illustrated by Rotraut Susanne Berner . The book follows a young boy named Robert , who is taught mathematics by a sly " number devil " called Teplotaxl over the course of twelve dreams .

The book was met with mostly positive reviews from critics , approving its description of math while praising its simplicity . Its colorful use of fictional mathematical terms and its creative descriptions of concepts have made it a suggested book for both children and adults troubled with math . The Number Devil was a bestseller in Europe , and has been translated into English by Michael Henry Heim .

= = Plot = =

Robert is a young boy who suffers from mathematical anxiety due to his boredom in school . His mother is Mrs. Wilson . He also experiences recurring dreams ? including falling down an endless slide or being eaten by a giant fish ? but is interrupted from this sleep habit one night by a small devilesque creature who introduces himself as the Number Devil . Although there are many Number Devils ( from Number Heaven ) , Robert only knows him as the Number Devil before learning of his actual name , Teplotaxl , later in the story .

Over the course of twelve dreams , the Number Devil teaches Robert mathematical principles . On the first night , the Number Devil appears to Robert in an oversized world and introduces the number one . The next night , the Number Devil emerges in a forest of trees shaped like " ones " and explains the necessity of the number zero , negative numbers , and introduces hopping , a fictional term to describe exponentiation . On the third night , the Number Devil brings Robert to a cave and reveals how prima @-@ donna numbers ( prime numbers ) can only be divided by themselves and one without a remainder . Later , on the fourth night , the Number Devil teaches Robert about rutabagas , another fictional term to depict square roots , at a beach .

For a time after the fourth night , Robert cannot find the Number Devil in his dreams ; later , however , on the fifth night , Robert finds himself at a desert where the Number Devil teaches him about triangular numbers through the use of coconuts . On the sixth night , the Number Devil teaches Robert about the natural occurrence of Fibonacci numbers , which the Number Devil shortens to Bonacci numbers , by counting brown and white rabbits as they reproduce multiple times . By this dream , Robert 's mother has noticed a visible change in Robert 's mathematical interest , and Robert begins going to sleep earlier to encounter the Number Devil . The seventh night brings Robert to a bare , white room , where the Number Devil presents Pascal 's triangle and the patterns that the triangular array displays . On the eighth night , Robert is brought to his classroom at school . The Number Devil arranges Robert 's classmates in multiple ways , teaches him about permutations , and what the Number Devil calls vroom numbers ( factorials ) .

On the ninth night , Robert dreams he is in bed , suffering from the flu , when the Number Devil appears next to him . The Number Devil teaches Robert about natural numbers , which the Number Devil calls garden @-@ variety numbers , the unusual characteristics of infinite , and infinite series . Robert finds himself at the North Pole , where the Number Devil introduces irrational numbers ( unreasonable numbers ) , as well as aspects of Euclidean geometry , such as vertices ( dots ) and edges ( lines ) . By the eleventh night , Robert has shown considerable increased interest in mathematics , but questions its validity , to which the Number Devil introduces the concept of mathematical proofs , ending with the Number Devil showing Robert a complicated proof of basic arithmetic . On the twelfth night , Robert and the Number Devil receive an invitation ( which names the Number Devil as Teplotaxl ) to Number Heaven , as Robert 's time with the Number Devil has finished . At Number Heaven , Robert learns of imaginary numbers , which Teplotaxl describes as imaginative numbers , as well as the Klein bottle . Walking through Number Heaven , Teplotaxl introduces Robert to various famous mathematicians , such as Fibonacci , whom Teplotaxl calls

Bonacci , and George Cantor , or Professor Singer . The book ends with Robert in class using his newfound mathematical knowledge .

= = History = =

Enzensberger fostered a passion for mathematics and numbers , although he was not a mathematician by trade . In 1998 , he delivered a speech at the International Congress of Mathematicians criticizing the isolation of mathematics from popular culture . The Number Devil was ultimately written on suggestion from Enzensberger 's eleven @-@ year @-@ old daughter Theresia . Because he was displeased with the way mathematics was taught to students at school , the German author decided to pen a book that teaches mathematics in an innovative way . German illustrator Rotraut Susanne Berner provided many full @-@ page illustrations , as well as smaller drawings , for the book . The Number Devil was first published in German in 1997 . The Number Devil has been noted for its unorthodox abandonment of standard notation ; instead , Enzensberger created a variety of fictional terms to help describe mathematical concepts . For instance , exponentiation takes the term hopping , and the fictional term unreasonable numbers was coined for irrational numbers . The UCLA Professor of Slavic Languages Michael Henry Heim translated the book from German to English . The translation was particularly difficult in that it required special attention to the numerical aspect of the book . He was also challenged by the necessity to use simple English words appropriate for the target audience of The Number Devil ? that is , children aged eleven to fourteen . The mathematics book was then published in English in 1998 .

The book was a hit across Europe , becoming a best seller in at least Spain , Germany , the Netherlands , and Italy . The Number Devil also had considerable success in Japan . After the success of The Number Devil , Enzensberger wrote a follow @-@ up , called Where Were You , Robert ? , a children 's book focusing on history rather than math . The German author has since stated he will not write any more young adult 's books , but instead direct his effort towards poetry . Viva Media later published an educational computer game , similarly titled The Number Devil : A Mathematical Adventure , based on the book . An audiobook was also released for The Number Devil .

= = Reception = =

The Number Devil received mostly positive reviews from critics . Mathematics professor John Allen Paulos of Temple University wrote an article for The New York Review of Books , praising The Number Devil as a " charming numerical fairy tale for children . " Likewise , mathematics writer Martin Gardner of the Los Angeles Times applauded Enzensberger 's introduction of mathematics " in such an entertaining way . " In a book review for The Baltimore Sun , Michael Pakenham approved of the book 's simplicity , writing , " it 's not incomprehensible . Not for a minute . "

Not all reviews were positive , however . The American Mathematical Society 's Deborah Loewenberg Ball and Hyman Bass reviewed the book from a mathematical perspective . Although they praised its " attractive and imaginative fantasy , " the two mathematicians found several issues . Ball and Bass were concerned with the The Number Devil 's negative characterization of math teachers , its apparent presentation of mathematics as magical rather than factual , and a number of other contentions . Ted Dewan , writing for the Times Educational Supplement , believed it to be " far more compelling than a standard text , " but found it less adventurous than he hoped for . He also criticized its use in mathematics education , stating " I suspect this is the sort of book that well @-@ meaning adults will mistakenly thrust upon children because it will be good for them . "