1035-01-1841 **Alexander G. Atwood*** (atwooda@sunysuffolk.edu), 533 College Road, Suffolk County Community College, Department of Mathematics, Selden, NY 11784. *The Enigma of Stanislaw Ulam: Mathematical Triumph in the Face of Brain Injury.*

In 1946, the mathematician Stanislaw Ulam was struck down by viral encephalitis. After emergency brain surgery, he underwent a recovery in which he regained many of his non-mathematical skills. However, his mathematical powers were substantially transformed. Although he was unable to concentrate on one subject for more than a few minutes and had significant difficulty in performing simple mathematical operations such as solving quadratic equations, his creative mathematical powers were substantially enlarged. In the next ten years, Ulam, in conjunction with von Neumann, Teller, Fermi and others, would create some of the outstanding achievements of applied mathematics in the twentieth century. These include the creation of the Monte Carlo Method, the formulation of the breakthrough principle which led to Thermonuclear Weapons, and seminal discoveries of non-linear dynamics in the Fermi-Pasta-Ulam problem. How was Ulam able to create these monumental mathematical achievements in the face of crippling mathematical limitations? How might have Ulam's brain compensated for his technical weaknesses? How did his ability to work with other mathematicians enable him to overcome his inability to concentrate? What can we learn from Ulam about the way in which the brain creates mathematics? (Received September 20, 2007)