



# Publications of Stanislaw M. Ulam

## Set Theory

Remark on the generalised Bernstein's theorem.\* *Fundamenta Mathematicae* 13(1929): 281-3.

Concerning functions of sets. \* *Fundamental Mathematicae* 14(1929): 231-3.

Über gewisse Zerlegungen von Mengen.\* *Fundamental Mathematical* 20(1933): 221-3.

On the equivalence of any set of first category to a set of measure zero (with J. C. Oxtoby).\* *Fundamental Mathematical* 31(1938): 201-6.

On visual hulls of sets (with G. H. Misters).\* *Proceedings of the National Academy of Sciences of the United States of America* 57(1967): 1172-4.

Note on the visual hull of a set (with W. A. Beyer).\* *Journal of Combinatorial Theory* 4(1968): 240-5.

On equations with sets as unknowns (with Paul Erdos). \* *Proceedings of the National Academy of Sciences of the United States of America* 60(1968): 1189-95.

## Measure

Zur Masstheorie in der allgemeinen Mengenlehre.\* *Fundamenta Mathematicae* 16(1930): 140-50. Also in *Mengenlehre*, edited by U. Feigner, 223-33. Darmstadt: Wissenschaftliche Gesellschaft, 1979.

\*This publication appears in *Stanislaw Ulam: Sets, Numbers, and Universes*, edited by W. A. Beyer, J. Mycielski, and G.-C. Rota. Cambridge, Massachusetts: The MIT Press, 1974.

Sur une propriété de la mesure de M. Lebesgue (with J. Schreier).\* *Comptes Rendus de L'Academie des Sciences* 192(1931): 539-42.

Zum Massbegriff in Produktraumen. " In *Verhandlungen, Internationaler Mathematikerkongress Zurich 1932*, volume 2, 118-9. Zurich: Orell Fussli Verlag, 1932.

Sur la theorie de la mesure dans les espaces combinatoires et son application au calcul des probabilités: I. Variables independantes (with Z. Lomnicki). \* *Fundamental Mathematical* 23(1934): 237-78.

On the existence of a measure invariant under a transformation (with J. C. Oxtoby). \* *Annals of Mathematics, Second Series* 40(1939): 560-6.

Measure-preserving homeomorphisms and metrical transitivity (with J. C. Oxtoby). \* *Annals of Mathematics, Second Series* 42(1941): 874-920.

What is measure? \* *American Mathematical Monthly* 50(1943): 597-602.

## Topology

On symmetric products of topological spaces (with Karol Borsuk).\* *Bulletin of the American Mathematical Society* 37(1931): 875-82.

Quelques propriétés topologiques du produit combinatoire (with C. Kuratowski).\* *Fundamenta Mathematicae* 19(1932): 247-51.

Eine Bemerkung über die Gruppe der topologischen Abbildungen der Kreislinie auf sich selbst (with J. Schreier).\* *Studia Mathematica* 5(1934): 155-9.

Über topologische Abbildungen der euklidischen Sphären (with J. Schreier). \* *Fundamental Mathematical* 23(1934): 102-18.

## Transformation Theory

Sur les transformations isometriques d'espaces vectoriels normes (with S. Mazur). \* *Comptes Rendus de L'Academie des Sciences* 194(1932): 946-8.

Sur les transformations continues des spheres euclidiennes (with J. Schreier). \* *Comptes Rendus de L'Academie des Sciences* 197(1933): 967-8.

Sur un coefficient lié aux transformations continues d'ensembles (with C. Kuratowski). \* *Fundamental Mathematical* 20(1933): 244-53.

Über gewisse Invarianten der  $\epsilon$ -Abbildungen (with Karol Borsuk). \* *Mathematische Annalen* 108(1933): 311-8.

On approximate isometrics (with D. H. Hyers). \* *Bulletin of the American Mathematical Society* 51(1945): 288-92.

Approximate isometrics of the space of continuous functions (with D. H. Hyers).\* *Annals of Mathematics, Second Series* 48(1947): 285-9.

Random processes and transformations. In *Proceedings of the International Congress of Mathematicians (Cambridge, Massachusetts, August 30-September 6, 1950)*, volume 2, 264-75. Providence, Rhode Island: American Mathematical Society, 1952.

Quadratic transformations. Part I (with M. T. Menzel and P. R. Stein). Los Alamos Scientific Laboratory report LA-2305, 1959.

Some properties of certain non-linear transformations. \* In *Mathematical Models in Physical Sciences. Proceedings of the Conference at the University of Notre Dame, 1962*, edited by Stefan Drobot, 85-95. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1963.

Computer studies of some history-dependent random processes (with W. A. Beyer and R. G. Schrandt). Los Alamos Scientific Laboratory report LA-4246, 1969.

Non-linear transformation studies on electronic computers (with P. R. Stein). \* *Rozprawy Matematyczne* 39(1963): 1-66. The Introduction and Part I are also in *Essays on Cellular Automata*, edited by Arthur W. Burks. Urbana, Illinois: University of Illinois Press, 1970.

Lectures in non-linear algebraic transformations (with P. R. Stein). In *Studies in Mathematical Physics*, edited by A. O. Barut, 263-314. Dordrecht, The Netherlands: D. Reidel Publishing Company, 1970.

## Group Theory

Sur le groupe des permutations de la suite des nombres naturels (with J. Schreier). \* *Comptes Rendus de L'Academie des Sciences* 197(1933): 737-8.

Über die Permutationsgruppe der natürlichen Zahlenfolge (with J. Schreier). \* *Studia Mathematica* 4(1933): 134--41.

Sur le nombre de generateurs d'un groupe semi-simple (with H. Auerbach). \* *Comptes Rendus de L'Academie des Sciences* 201(1935): 117-9.

Sur le nombre de generateurs d'un groupe topologique compact et connexe (with J. Schreier). \* *Fundamental Mathematical* 24(1935): 302-4.

Über die Automorphismen der Permutationsgruppe der natürlichen Zahlenfolge (with J. Schreier). \* *Fundamental Mathematical* 28(1937): 258-60.

On ordered groups (with C. J. Everett). \* *Transactions of the American Mathematical Society* 57(1945): 208-16.

On some possibilities of generalizing the Lorentz group in the special relativity theory (with C. J. Everett). \* *Journal of Combinatorial Theory* 1( 1966): 248-70.

## Miscellaneous Mathematical Topics

Probleme 56. *Fundamental Mathematical* 20(1933): 285.

Sur une propriete caracteristique de l'ellipsoide (with H. Auerbach and S. Mazur). \* *Monatsheften für Mathematik and Physik* 42(1935): 45-8.

Probleme 74. *Fundamental Mathematical* 30(1938): 365.

Problemes P34; P35; P35,R1 (with S. Banach). *Colloquium Mathematicum* 1(1947): 152-3.

Approximately convex functions (with D. H. Hyers). \* *Proceedings of the American Mathematical Society* 3(1952): 821-8.

A property of randomness of an arithmetical function (with N. Metropolis). \* *American Mathematical Monthly* 60( 1953): 252-3.

On the stability of differential expressions (with D. H. Hyers). \* *Mathematics Magazine* 28(1954): 59-64.

An open problem. In *Recent Advances in Game Theory*, 223. Princeton, New Jersey: Princeton University Conference, 1962.

Some problems of a dilettante. Problems 110, 111, and 112. In *Proceedings of the 1963 Num-*

*ber Theory Conference, University of Colorado, Boulder, Colorado, August 5-24, 1963*, edited by S. Chowla and B. Jones, 114-5.

Problems and games in mathematics (with R. D. Mauldin). *Advances in Applied Mathematics* 8( 1987):28 1-344.

## Branching Processes

Theory of multiplicative processes (with D. Hawkins). Los Alamos Scientific Laboratory report LA-171, 1944.

Multiplicative systems, I (with C. J. Everett). \* *Proceedings of the National Academy of Sciences of the United States of America* 34( 1948): 403-5.

Multiplicative systems in several variables. Parts I, II, and III (with C. J. Everett). Los Alamos Scientific Laboratory reports LA-683, LA-690, and LA-707, 1948.

Computations on certain binary branching processes. In *Computers in Mathematical Research*, edited by R. F. Churchhouse and J.-C. Herz, 168-171. Amsterdam: North-Holland Publishing Company, 1968.

## Weapons Research

Fourteen weapons-related reports written by Ulam and his collaborators between 1944 and 1958 are still classified. These are listed in "Publications of Stanislaw M. Ulam," compiled by B. Hendry (Los Alamos Scientific Laboratory report LAMS-3923, 1968) and in *Stanislaw Ulam: Sets, Numbers, and Universes*, edited by W. A. Beyer, J. Mycielski, and G.-C. Rota (The MIT Press, 1974).

## Algebra

Projective algebra I (with C. J. Everett). \* *American Journal of Mathematics* 68(1946): 77-88.

Generators for algebras of relations (with A. R. Bednarek). *Bulletin of the American Mathematical Society* 82( 1976):78 1-2.

Projective algebra and the calculus of relations (with A. R. Bednarek). *Journal of Symbolic Logic* 43( 1978): 56-64.

## Monte Carlo Method

Statistical methods in neutron diffusion (with J. von Neumann). Report written by R. D. Richtmyer and J. von Neumann. Los Alamos Scientific Laboratory report LAMS-551, 1947. Also in *Von Neumann: Collected Works, 1903-1957*, edited by A. H. Taub, volume 5. Oxford: Pergamon Press, 1963.

The Monte Carlo method (with Nicholas Metropolis). \* *Journal of the American Statistical Association* 44(1949): 335-41.

On the Monte Carlo method. In *Proceedings of the 1949 Symposium on Large-Scale Digital Calculating Machines, 207-1 2*. Cambridge, Massachusetts: Harvard University Press, 1951.

Monte Carlo calculations in problems of mathematical physics. In *Modern Mathematics for the Engineer, Second Series*, edited by Edwin F. Beckenbach, 95-108. New York: McGraw-Hill Book Company, Inc., 1961.

## Mathematical Physics

Heuristic studies in problems of mathematical physics on high speed computing machines (with J. Pasta). Los Alamos Scientific Laboratory report LA-1557, 1953.

Studies of nonlinear problems. Part I (with E. Fermi, M. Tsingou, and J. Pasta). \* Los Alamos Scientific Laboratory report LA- 1940, 1955. Also in *Enrico Fermi: Collected Papers*, volume 2, edited by E. Amaldi, H. L. Anderson, E. Persico, E. Segre, and A. Wattenberg. Chicago: University of Chicago Press, 1965.

Infinite models in physics.\* In *Proceedings of the Seventh Symposium in Applied Mathematics (Brooklyn Polytechnic Institute, April 14-15, 1955)*. American Mathematical Society Symposia in Applied Mathematics, volume 7, 87-95. New York: McGraw-Hill Book Company, Inc., 1957.

On the possibility of extracting energy from gravitational systems by navigating space vehicles. Los Alamos Scientific Laboratory report LAMS-2219, 1958.

Heuristic numerical work in some problems of hydrodynamics (with John R. Pasta). \* In *Mathematical Tables and Other Aids to Computation* 13(1959): 1-12.

Stability of many-body computations. In *Hydrodynamic Instability*, edited by Garrett Birkhoff, Richard Bellman, and C. C. Lin, 247-58. American Mathematical Society Symposia in Applied Mathematics, volume 13. Providence, Rhode Island: American Mathematical Society, 1962.

The entropy of interacting populations (with C. J. Everett). Los Alamos Scientific Laboratory report LA-4256, 1969.

Ideas of space and space-time.\*\* *Rehovot Magazine*, Winter 1972-73, 29-33.

Infinites. In *The Heritage of Copernicus*, edited by J. Neyman, 378-92. Cambridge, Massachusetts: The MIT Press, 1974.

Physics for mathematicians.\*\* In *Physics and Our World: A Symposium in Honor of Victor F. Weisskopf (Massachusetts Institute of Technology, 1974)*, edited by Kerson Huang, 113–21. AIP Conference Proceedings, number 28. New York: American Institute of Physics, Inc., 1976.

On the operations of pair production, transmutations, and generalized random walks. *Advances in Applied Mathematics 1(1980): 7-21.*

Further applications of mathematics in the natural sciences.\*\* In *American Mathematical Heritage: Algebra and Applied Mathematics*, edited by J. Dalton Tarwater, 101–14. Texas Tech University Mathematics Series, volume 13. Lubbock, Texas: Texas Technological University Press, 1981.

Speculations on some possible mathematical frameworks for the foundations of certain physical theories. *Letters in Mathematical Physics 10(1985): 101-6.*

## Dynamical Systems

On the ergodic behavior of dynamical systems. In “Series of lectures on physics of ionized gases.” Los Alamos Scientific Laboratory report LA–2055, 1956.

On some statistical properties of dynamical systems. \* In *Proceedings of the Fourth Berkeley Symposium on Mathematical Statistics and Probability (University of California, Berkeley, June 20–July 30, 1960)*, edited by Lucian M. Le Cam, Jerzy Neyman, and Elizabeth Scott, volume 3, 315–20. Berkeley: University of California Press, 1961. Translated into Russian (1963).

On general formulations of simulation and model construction. In *Prospects for Simulation and Simulators of Dynamic Systems*, edited by George Shapiro and Milton Rogers, 3–8. New York: Spartan Books, 1967.

Transformations, iterations and mixing flows. In *Dynamical Systems II*, edited by A. R. Bednarek and L. Cesari, 419–26. New York: Academic Press, 1982.

## Space Propulsion

On a method of propulsion of projectiles by means of external nuclear explosions (with C. J. Everett). Los Alamos Scientific Laboratory report LAMS-1955, 1955.

Statement before the U.S. House of Representatives. *Hearings on Astronautics and Space Exploration*. 85th Congress, 2nd session, April 15–May 12, 1958.

\*\*This publication appears in *Science, Computers and People: From the Tree of Mathematics*, “ edited by Mark C. Reynolds and Gian-Carlo Rota. Boston: Birkhauser, 1986.

Nuclear propelled vehicle, such as a rocket (with C. J. Everett). British Patent 877,392, 1961.

The future of nuclear energy in space: A panel discussion sponsored by the Aerospace Division, American Nuclear Society, at the 1963 winter meeting in New York City, N. Y. on November 20, 1963 (with F. deLuzio, W. von Braun, M. Hunter, and I. Asimov), edited by R. F. Trapp. Also in *Nuclear News*, July 1964.

The Orion project.\*\* *Nuclear News*, January 1965, 25–7.

## Number Theory

On certain sequences of integers defined by sieves (with Verna Gardiner, R. Lazarus, and N. Metropolis).\* *Mathematics Magazine 29(1956): 117–22.*

A visual display of some properties of the distribution of primes (with M. L. Stein and M. B. Wells ).” *American Mathematical Monthly 71(1964):5 16-20.*

An observation on the distribution of primes (with M. Stein). \* *American Mathematical Monthly 74(1967): 43-4.*

Some probabilistic remarks on Fermat’s last theorem (with P. Erdos). ” *Rocky Mountain Journal of Mathematics 1(1971): 613-6.*

## Combinatorics

Study of certain combinatorial problems through experiments on computing machines (with P. R. Stein). In *Proceedings of the 1955 High-Speed Computer Conference (Louisiana State University, Baton Rouge, Louisiana, February 14–16, 1955)*, 101–6.

Combinatorial analysis in infinite sets and some physical theories. *SIAM Review 6(1964): 343-55.*

Some combinatorial problems studied experimentally on computing machines. In *Applications of Number Theory to Numerical Analysis*, edited by S. K. Zaremba, 1–10. New York: Academic Press, Inc., 1972.

## Computers and Computing

Experiments in chess (with J. Kister, P. Stein, W. Walden, and M. Wells). \* *Journal of the Association for Computing Machinery 4(1957): 174-7.*

Experiments in chess on electronic computing machines (with P. R. Stein).\*\* *Chess Review*, January 1957, 13–5. Also in *Computers and Automation*, September 1957.

On some new possibilities in the organization and use of computing machines. IBM research report RC-86, 1957.

The late John von Neumann on computers and the brain.\*\* *Scientific American*, June 1958, 127.

Electronic computers and scientific research. In *The Age of Electronics*, edited by Cad F. J. Overhage, 95–108. New York: McGraw-Hill Book Company, Inc., 1962. Also in *Computers and Automation*, August 1963 and September 1963.

Computers.\*\* *Scientific American*, September 1964, 202–216.

La machine creatrice. In *Rencontres Internationales de Geneve “Le robot, la bete et l’homme (1965)*, 31-42. Neuchatel: Editions de la Baconniere, 1966.

Some remarks on relational composition in computational theory and practice (with A. R. Bednarek). In *Fundamentals of Computation Theory: Proceedings of the 1977 International FCT-Conference (Poznan-Kornik, Poland, September 19–23, 1977)*, edited by Marek Karpiriski, 22–32. Lecture Notes in Computer Science, volume 56. Berlin: Springer-Verlag, 1977.

On the theory of relational structures and schemata for parallel computation (with A. R. Bednarek). Los Alamos Scientific Laboratory report LAMS–6734, 1977.

An integer valued metric for patterns (with A. R. Bednarek). In *Fundamentals of Computation Theory, 52–7*. Berlin: Akademie-Verlag, 1979.

Von Neumann: The interaction of mathematics and computing.\*\* In *A History of Computing in the Twentieth Century: A Collection of Essays*, edited by N. Metropolis, J. Hewlett, and Gian-Carlo Rota, 93–9. New York: Academic Press, Inc., 1980.

A mathematical physicist looks at computing.\*\* *Rehovot Magazine*, volume 9, number 1, 47–9.

## Biomathematics

On some mathematical problems connected with patterns of growth of figures.\*\* *Applied Mathematics 14( 1962): 2 15–24.* Also in *Essays on Cellular Automata*, edited by Arthur W. Burks. Urbana, Illinois: University of Illinois Press, 1970.

How to formulate mathematically problems of the rate of evolution? \*\* In *Proceedings of the Symposium on Mathematical Challenges to the Neo-Darwinian Interpretation of Evolution, New York, April 5-8, 1961*, edited by Paul S. Moorhead and Martin M. Kaplan. Providence, Rhode Island: American Mathematical Society. Wistar Institute Monograph 5: (1967) 21-33, April 25-26, 1966 New York: A. Liss, 1985.

On recursively defined geometrical objects and patterns of growth (with R. G. Schrandt).\* \* Los

Alamos Scientific Laboratory report LA-3762, 1967. Also in *Essays on Cellular Automata*, edited by Arthur W. Burks. Urbana, Illinois: University of Illinois Press, 1970.

On the pairing process and the notion of genealogical distance (with Jan Mycielski). \* *Journal of Combinatorial Theory* 6(1969): 227-34.

Some elementary attempts at numerical modeling of problems concerning rates of evolutionary processes (with R. Schrandt). Los Alamos Scientific Laboratory report LAMS-4573, 1971.

Metrics in biology: An introduction (with W. A. Beyer, T. F. Smith, and M. L. Stein). Los Alamos Scientific Laboratory report LA-4973, 1972.

Some ideas and prospects in biomathematics. \* *Annual Review of Biophysics and Bioengineering* 1(1972): 277-91.

A molecular sequence metric and evolutionary trees (with William A. Beyer, Myron L. Stein, and Temple F. Smith). *Mathematical Biosciences* 19(1974): 9-25.

The role of abstract mathematical ideas in possible conceptual advances in natural sciences, more specifically biology. In *Proceedings of International Colloquium on the Role of Mathematical Physics in the Development of Science (College de France, Paris, June 13-15, 1977)*, edited by Dominique Akl, Moshe Flato, and Daniel Stemheimer, 12-25. UNESCO, 1978.

Speculations about the mechanism of recognition and discrimination. Los Alamos National Laboratory unclassified release LAUR 82-62, 1982.

Reflections on the brain's attempts to understand itself. *Los Alamos Science*, number 15, 1987, 283-7.

## Astronomy

Possibility of an accelerated process of collapse of stars in a very dense centre of a cluster or a galaxy (with W. E. Walden). *Nature* 201(1964): 1202.

Collapse of stellar systems. In *Proceedings of the 25th International Astronomical Union Symposium (Thessaloniki, Greece, August 16-22, 1964)*, 76-7. International Astronomical Union, 1966.

Numerical studies of star systems. In *Colloque sur le Probleme des N Corps*, 265-7. Editions du Centre National de la Recherche, 1968.

## Complexity

The notion of complexity (with W. A. Beyer and M. L. Stein). Los Alamos Scientific Laboratory report LA-4822, 1971.

On the notion of analogy and complexity in some constructive mathematical schemata. Los Alamos National Laboratory report LA-9065, 1981. Also in *Probability, Statistical Mechanics, and Number Theory*, edited by Gian-Carlo Rota. Advances in Mathematics: Supplementary Studies, volume 9. New York: Academic Press, Inc., 1986.

## Graph Theory

Generalizations of product isomorphisms. In *Recent Trends in Graph Theory*, 215. Lecture Notes in Mathematics, volume 186. Berlin: Springer-Verlag, 1971.

Minimal decomposition of two graphs into pairwise isomorphic subgraphs (with F. R. K. Chung, P. Erdos, R. L. Graham, and F. F. Yao). In *Proceedings of the Tenth Southeastern Conference on Combinatorics, Graph Theory, and Computing (Florida Atlantic University, Boca Raton, Florida, April 2-6, 1979)*, volume 1, 3-18. Congressus Numerantium, volume 23. Winnipeg, Manitoba: Utilitas Mathematical Publishing Incorporated, 1979.

## Obituaries

Stefan Banach, 1892-1945.\* \* *Bulletin of the American Mathematical Society* 52(1946): 600-3. Homage to Fermi. *Santa Fe New Mexican*, January 6, 1955.

Marian Smoluchowski and the theory of probabilities in physics.\*\* *American Journal of Physics* 25(1957): 475-8 1.

John von Neumann, 1903-1957.\* \* *Bulletin of the American Mathematical Society* 64( 1958): 1-49.

Kazimierz Kuratowski, 1896-1980.\* \* *Polish Review* 26( 198 1): 62-6.

Kazimierz Kuratowski, Wspomnienia. *Wiadomosci Matematyczne*, 1983. Translated into Polish by R. Engelking. (1983).

## Miscellaneous Topics

Review of *Funkcje Rzeczywiste* by Roman Sikorski. *Bulletin of the American Mathematical Society* 65( 1959): 305-6.

Statement before the Joint Committee on Atomic Energy. In *Frontiers in Atomic Energy Research: Hearings before the Subcommittee on Research and Development of the Joint Committee on Atomic Energy, Eighty-sixth Congress, Second Session, March 22-25, 1960*, 282-5. Washington, D. C.: U.S. Government Printing Office, 1960.

Communication to the U.S. Senate Committee on Foreign Relations. In *Nuclear Test Ban Treaty: Hearings before the Committee on Foreign Relations, United States Senate, Eighty-Eighth*

*Congress, First Session, on Executive M, 505-6 and 993*. Washington, D. C.: U.S. Government Printing Office, 1963.

Thermonuclear devices.\*\* In *Perspectives in Modern Physics: Essays in Honor of Hans A. Bethe*, edited by R. E. Marshak and J. Warren Blaker, 593-60 1. New York: Interscience Publishers, 1966.

An education in applied math. In *Proceedings of May 24-27, 1966 SIAM Conference (Aspen, Colorado)*, edited by James Ortega, Paul I. Richards, and Frank W. Sinden. *SIAM Review* 9(1967): 343-4.

Philosophical implications of some recent scientific discoveries.\*\* In *Science, Philosophy and Religion*. Proceeding Symposium Kirtland Air Force Laboratory, Albuquerque, New Mexico 44-48. (1968).

Wspomnienia Kawiarni Szkockiej (Reminiscences of the Scottish Cafe). *Wiadomosci Matematyczne* 12(1969): 49-58. Available in English only in manuscript form.

The applicability of mathematics.\*\* In *The Mathematical Sciences: A Collection of Essays*, edited by the National Research Council's Committee on Support of Research in the Mathematical Sciences, 1-6. Cambridge, Massachusetts: The M.I.T. Press, 1969.

Foreword to *My World Line: An Informal Autobiography* by G. Gamow. New York: Viking Press, 1970.

Testimony before the United States District Court, District of Minnesota, Minneapolis, Minnesota, September 17, 1971, in the case of Honeywell Incorporated versus Sperry Rand Corporation, 7342-438.

Gamow—and mathematics.\*\* In *Cosmology, Fusion & Other Matters.. George Gamow Memorial Volume*, edited by Frederick Reines, 272-9. Boulder, Colorado: Colorado Associated University Press, 1972.

New rules and old games. *Outlook*, Spring 1974, 32-3.

Arthur Koestler et le defi du hazard: Entretien avec Stan Ulam de Pierre Debray-Ritzen. In *Arthur Koestler*, 428-32. Cahiers de l'Herne. Paris: Edition de L'Herne, 1975.

Przygody matematyka. *Kultura* 9(30 Lipca 1978) Translated into Polish by Jerzy Jaruzelski.

Banach i inni. *Kultura* 10(6 Sierpnia 1978). Translated into Polish by Jerzy Jaruzelski.

Narodziny "Ksigi Szkockiej." *Kultura* 10(13 Sierpnia 1978). Translated into Polish by Jerzy Jaruzelski.

Preface to *A Half Century of Polish Mathematics: Remembrances and Reflections* by Kazimierz Kuratowski. International Series in Pure and Applied Mathematics, Volume 108. Oxford: Pergamon Press Ltd., 1980.

An anecdotal history of the Scottish Book. In *The Scottish Book: Mathematics from the Scottish Cafe*, edited by R. Daniel Mauldin. Boston: Birkhauser, 1982.

Reflections of the Polish masters: An interview with Stan Ulam and Mark Kac. *Los Alamos Science*, volume 3, number 3, 1982, 54-65.

Introduction\*\* to *Selected Studies: Physics-Astrophysics, Mathematics, History of Science. A Volume Dedicated to the Memory of Albert Einstein*, edited by Themistocles M. Rassias and George M. Rassias. Amsterdam: North-Holland Publishing Company, 1982.

## Books

*The Scottish Book: A Collection of Problems.* An edited translation of a notebook kept at the Scottish Cafe for the Lwow Section of the Societe Polonaise de Mathematiques. Privately mimeographed and distributed by S. M. Ulam in 1957. Reprinted as Los Alamos Scientific Laboratory report LA-6832, 1967.

*Mathematics and Logic: Retrospect and Prospects* (with Mark Kac). New York: Frederick A. Praeger, Inc., 1968. The text of this book first appeared as the article entitled "Mathematics and logic: Retrospect and prospects" in *Britannica Perspectives*, volume 1, 557-732. Chicago: Encyclopedia Britannica, Inc., 1968. Translated into French (1973), into Serbo-Croatian (1977), and into Spanish (1979).

*Stanislaw Ulam: Sets, Numbers, and Universes*, edited by W. A. Beyer, J. Mycielski, and G.-C. Rota. Cambridge, Massachusetts: The MIT Press, 1974.

*Adventures of a Mathematician.* New York: Charles Scribners Sons, 1976. Paperback editions published in 1977 and 1983. Translated into Japanese (1979).

*A Collection of Mathematical Problems.* \* New York: Interscience Publishers, 1960. Reprinted as *Problems in Modern Mathematics.* John Wiley & Sons, Inc., 1964. Translated into Russian (1964).

*Science, Computers, and People: From the Tree of Mathematics*, edited by Mark C. Reynolds and Gian-Carlo Rota. Boston: Birkhauser, 1986.

*Mathematics at Los Alamos: The Collected Los Alamos Reports of S. Ulam and Collaborators, 1944-1984*, edited by D. Sharp and M. Simmons. To be published by University of California Press.

This report was prepared as an account of work sponsored by the United States Government. Neither the United States Government, nor the United States Department of Energy, nor any of their employees makes any warranty, expressed or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, mark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

Los Alamos National Laboratory is an Equal Opportunity Employer conducting a variety of national defense programs and energy-related programs, as well as a broad spectrum of basic scientific research. For scientific and technical employment opportunities, individuals and academic placement officers are encouraged to contact the Personnel Division Leader, Los Alamos National Laboratory, Los Alamos, New Mexico, 87545.

# Los Alamos Science

*Editor*

Necia Grant Cooper

*Science Writers*

Roger Eckhardt  
Nancy Shera

*Design, Illustration, and Production*

Gloria Sharp  
Katherine Norskog

*Circulation*

Dixie McDonald

*Photography*

John Flower

*Printing*

Jim E. Lovato

*Calligraphy*

Kathi Parker

*Production Assistance*

Kelly Parker

*Photo Processing*

IS-9 Photography Group

Los Alamos Science is published by Los Alamos National Laboratory, an Equal Opportunity Employer operated by the University of California for the United States Department of Energy under contract W-7405 - ENG-36.

*Address Mail to*

Los Alamos Science  
Mail Stop M708  
Los Alamos National Laboratory  
Los Alamos, New Mexico 87545





