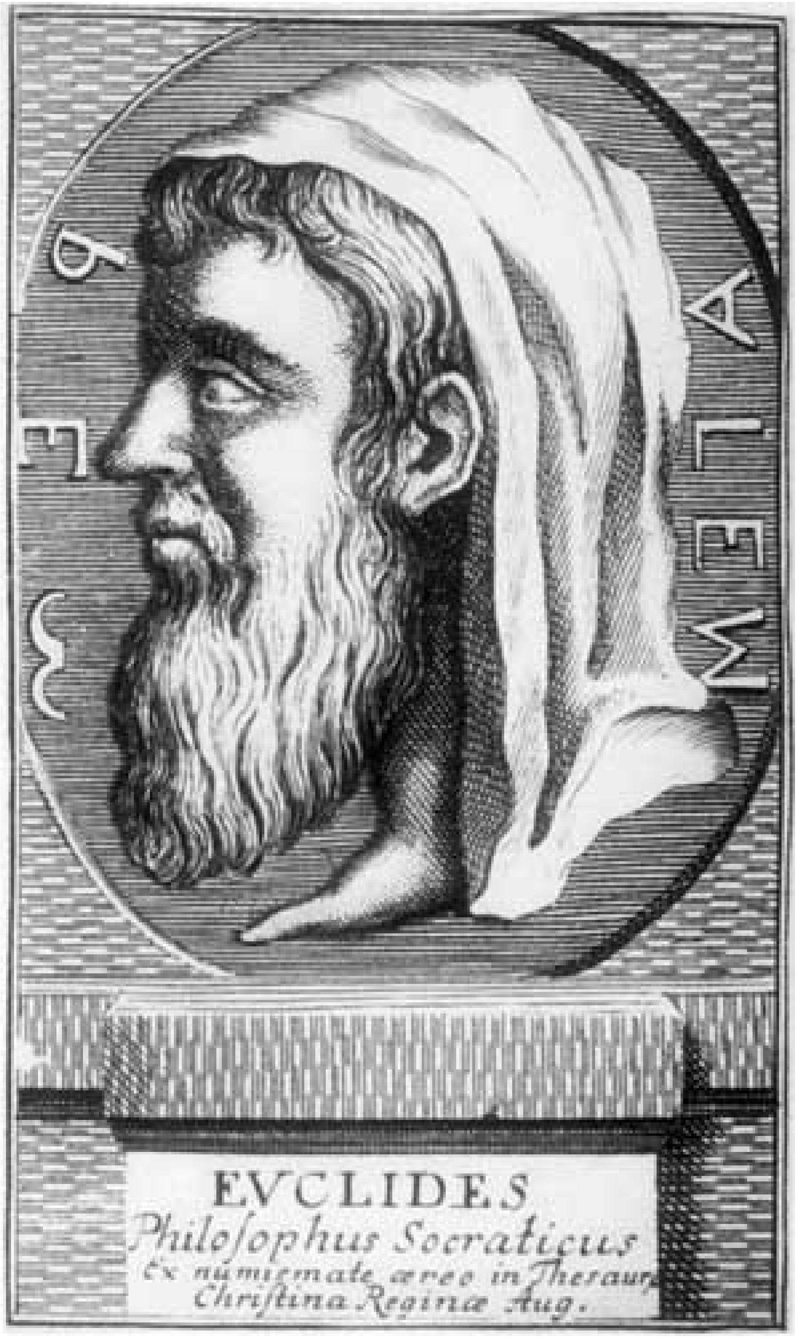


Euclid of Alexandria

Almost from the time of its writing and lasting almost to the present, the Elements have exerted a continuous and major influence on human affairs. It was the primary source of geometric reasoning, theorems, and methods at least until the advent of non-Euclidean geometry in the 19th century. It is sometimes said that, next to the Bible, the "Elements" may be the most translated, published, and studied of all the books produced in the Western world.

http://www-groups.dcs.st-andrews.ac.uk/history/Mathematicians/Euclid.html

Pythagoras of Samos

Pythagoras was a Greek philosopher who made important developments in mathematics, astronomy, and the theory of music. The theorem now known as Pythagoras's theorem was known to the Babylonians 1000 years earlier but he may have been the first to prove it.

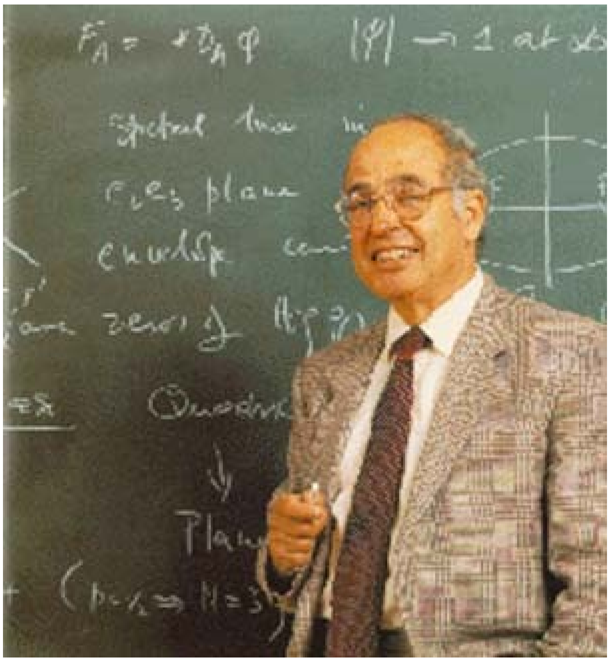
http://turnbull.mcs.st-and.ac.uk/history/Mathematicians/Pythagoras.html

John Frank Adams

... in recognition of his solution of several outstanding problems of algebraic topology and of the methods he invented for this purpose which have proved of prime importance in the theory of that subject.

http://www-groups.dcs.st-andrews.ac.uk/history/Mathematicians/Adams_Frank.html

Michael Francis Atiyah



Oxford was to remain Atiyah's base until 1990 when he became Master of Trinity College, Cambridge and Director of the newly opened Isaac Newton Institute for Mathematical Sciences in Cambridge.

Atiyah showed how the study of vector bundles on spaces could be regarded as the study of cohomology theory, called *K*-theory. Grothendieck also contributed substantially to the development of *K*-theory. In [4] Atiyah's early mathematical work is described as follows:-

Michael Atiyah has contributed to a wide range of topics in mathematics centring around the interaction between geometry and analysis. His first major contribution (in collaboration with F Hirzebruch) was the development of a new and powerful technique in topology (K-theory) which led to the solution of many outstanding difficult problems. Subsequently (in collaboration with I M Singer) he established an important theorem dealing with the number of solutions of elliptic differential equations. This 'index theorem' had antecedents in algebraic geometry and led to important new links between differential geometry, topology and analysis. Combined with considerations of symmetry it led (jointly with Raoul Bott) to a new and refined 'fixed point theorem' with wide applicability.

Félix Édouard Justin Émile Borel

For his scientific work he received the first gold medal of the Centre National de la Recherché Scientifique in 1955.

http://www-groups.dcs.st-andrews.ac.uk/history/Mathematicians/Borel.html

Luitzen Egbertus Jan Brouwer

Brouwer's doctoral dissertation, published in 1907, made a major contribution to the ongoing debate between Russell and Poincaré on the logical foundations of mathematics.

http://turnbull.mcs.st-and.ac.uk/history/Biographies/Brouwer.html

Leonard Eugene Dickson

Dickson presented a unified, complete, and general theory of the classical linear groups - not merely over the prime field GF(p) as Jordan had done - but over the general finite field GF (p^n), and he did this against the backdrop of a well- developed theory of these underlying fields.

http://www-groups.dcs.st-andrews.ac.uk/history/Mathematicians/Dickson.html

Jean Alexandre Eugène Dieudonné

He began his mathematical career working on the analysis of polynomials. He worked in a wide variety of mathematical areas including general topology, topological vector spaces, algebraic geometry, invariant theory and the classical groups.

http://turnbull.mcs.st-and.ac.uk/history/Biographies/Dieudonne.html

Beno Eckmann

Saunders Mac Lane spoke at the Colloquium about Eckmann's contributions to the founding of homological algebra and category theory. Peter Hilton, who had been a personal friend of Eckmann's for many years spoke in detail of Eckmann's research in topology: continuous solutions of systems of linear equations, a group-theoretical proof of the Hurwitz-Radon theorem, complexes with operators, spaces with means, simple homotopy type.

http://turnbull.mcs.st-and.ac.uk/history/Biographies/Eckmann.html

Leonhard Euler

... after 1730 *he carried out state projects dealing with cartography, science education, magnetism, fire engines, machines, and ship building. ... The core of his research program was now set in place: number theory; infinitary analysis including its emerging branches, differential equations and the calculus of variations; and rational mechanics. He viewed these three fields as intimately interconnected. Studies of number theory were vital to the foundations of calculus, and special functions and differential equations were essential to rational mechanics, which supplied concrete problems.*

http://www-groups.dcs.st-andrews.ac.uk/history/Mathematicians/Euler.html

John Charles Fields

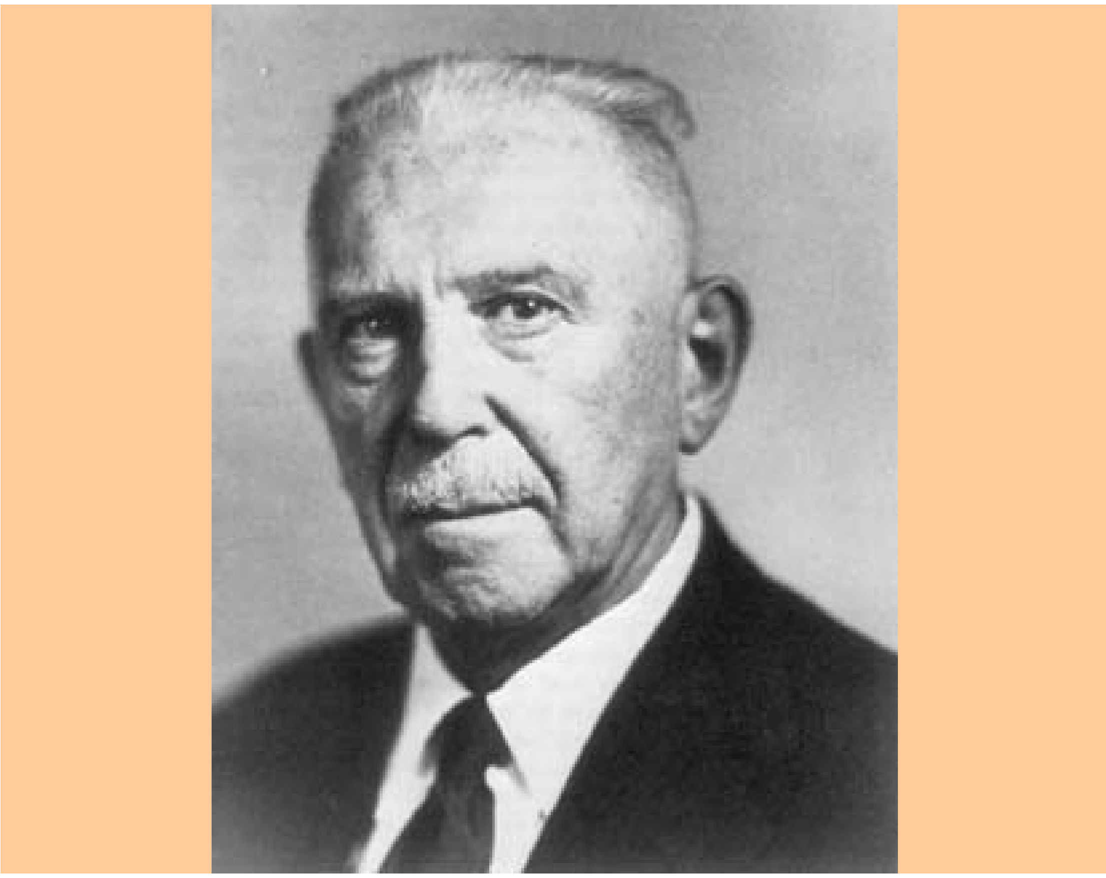
Fields provided funds for an international medal for mathematical distinction: the mathematical equivalent of a Nobel prize

http://turnbull.mcs.st-and.ac.uk/history/Mathematicians/Fields.html

Johann Carl Friedrich Gauss

…a decade later, when he was informed of Lobachevsky's work on the subject, he praised its "genuinely geometric" character, while in a letter to Schumacher in 1846, states that he *had the same convictions for* 54 *years* indicating that he had known of the existence of a non-Euclidean geometry since he was 15 years of age.

http://www-groups.dcs.st-andrews.ac.uk/history/Mathematicians/Gauss.html

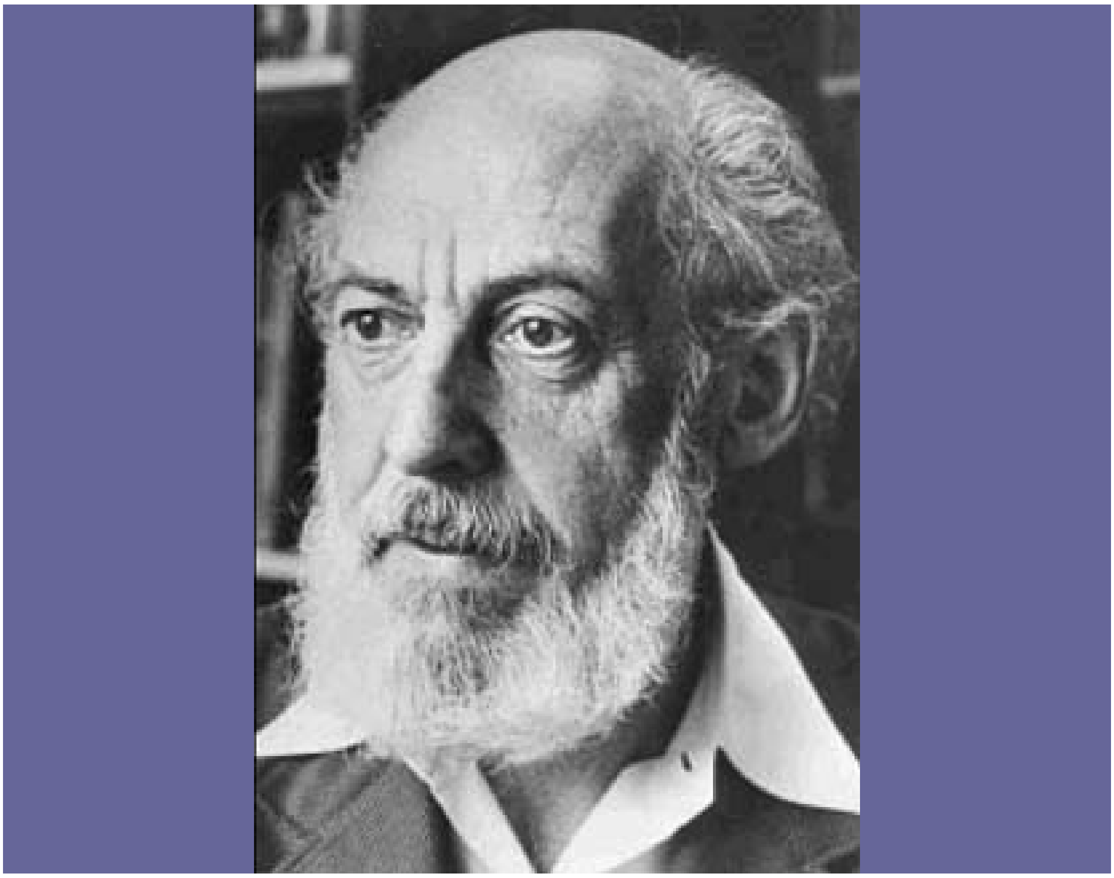


Solomon Lefschetz

He had the misfortune to lose both his hands in a laboratory accident in November 1907.

The importance to American mathematicians of a first-class journal is that it sets high standards for them to aim at. In this somewhat indirect manner, Lefschetz profoundly affected the development of mathematics in the United States.

http://www-groups.dcs.st-andrews.ac.uk/history/Mathematicians/Lefschetz.html



Samuel Eilenberg

We went from discovery to discovery, Sammy having an extraordinary gift for formulating at each moment the conclusions that would emerge from the discussion.

http://www-groups.dcs.st-andrews.ac.uk/history/Mathematicians/Eilenberg.html

Hans Freudenthal

His thoughts and his works went in many complementary directions: mathematics, history of mathematics, mathematics education, philosophy

http://www-groups.dcs.st-andrews.ac.uk/history/Mathematicians/Freudenthal.html

Henri Paul Cartan

Henri worked on analytic functions, the theory of sheaves, homological theory, algebraic topology and potential theory.

http://www-groups.dcs.st-andrews.ac.uk/history/Mathematicians/Cartan Henri.html

Heinz Hopf

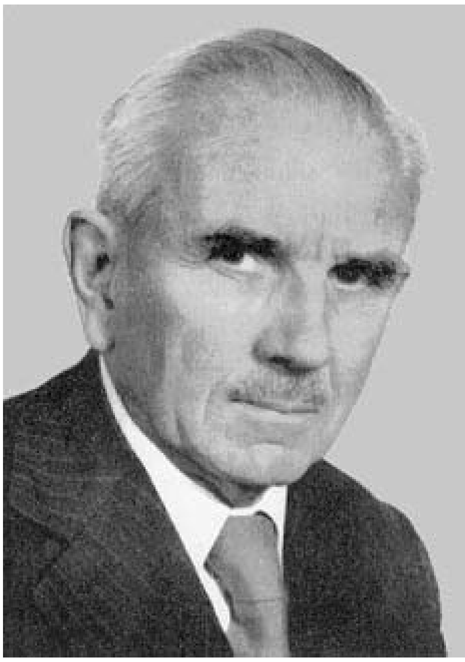
Without doubt Heinz Hopf was one of the most distinguished mathematicians of the twentieth century. His work is closely linked with the emergence of algebraic topology

http://www-groups.dcs.st-andrews.ac.uk/history/Mathematicians/Hopf.html

Ioan Mackenzie James

James has done wide ranging work in topology, particularly in homotopy theory. His first publication was in 1953, followed by four publications in 1954 which were all written jointly with Henry Whitehead. These papers were on fibre spaces and the homotopy theory of sphere bundles over spheres. James then published on suspensions, on multiplication on spheres, on cup-products, and, another publication with Henry Whitehead, *Homology with zero coefficients.* He then wrote many papers on homotopy groups and Stiefel manifolds.

Jean Leray



... algebraic topology should not only study the topology of a space, i.e. algebraic objects attached to a space, invariant under homomorphisms, but also the topology of a representation (*continuous map*), *i.e. topological invariants of a similar nature for continuous maps.*

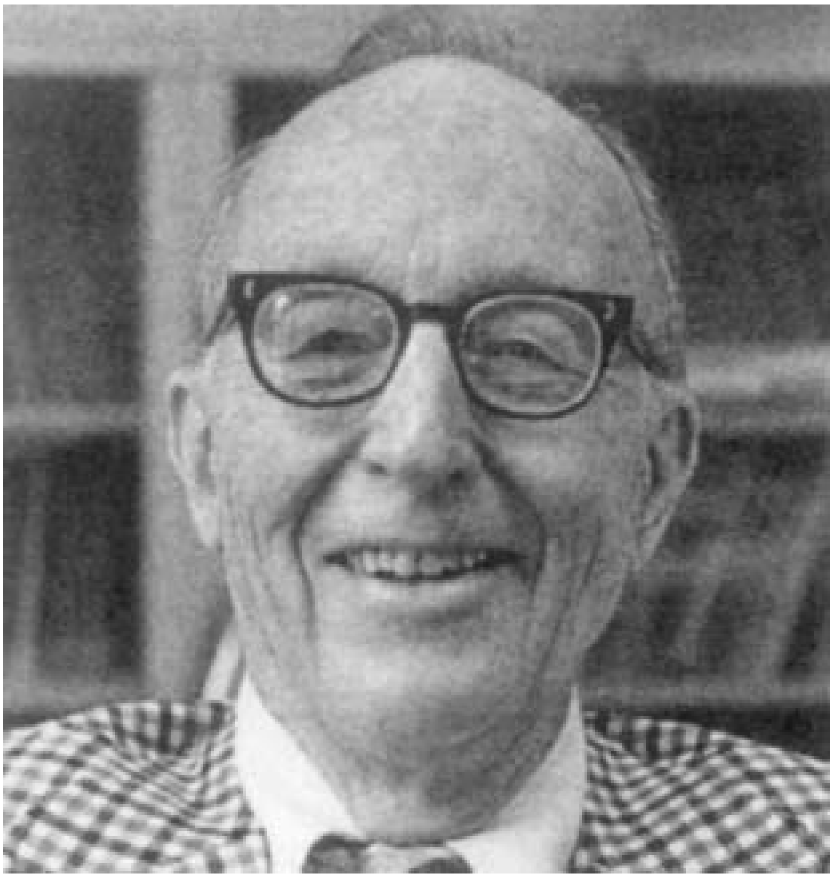
Following this line he published papers which introduced sheaves, and the spectral sequence of a continuous map.

http://turnbull.mcs.st-and.ac.uk/history/Biographies/Leray.html

Marius Sophus Lie

I was overwhelmed by the richness and beauty of the geometric ideas flowing from Lie's work. Only a small part of this has been absorbed into mainstream mathematics.

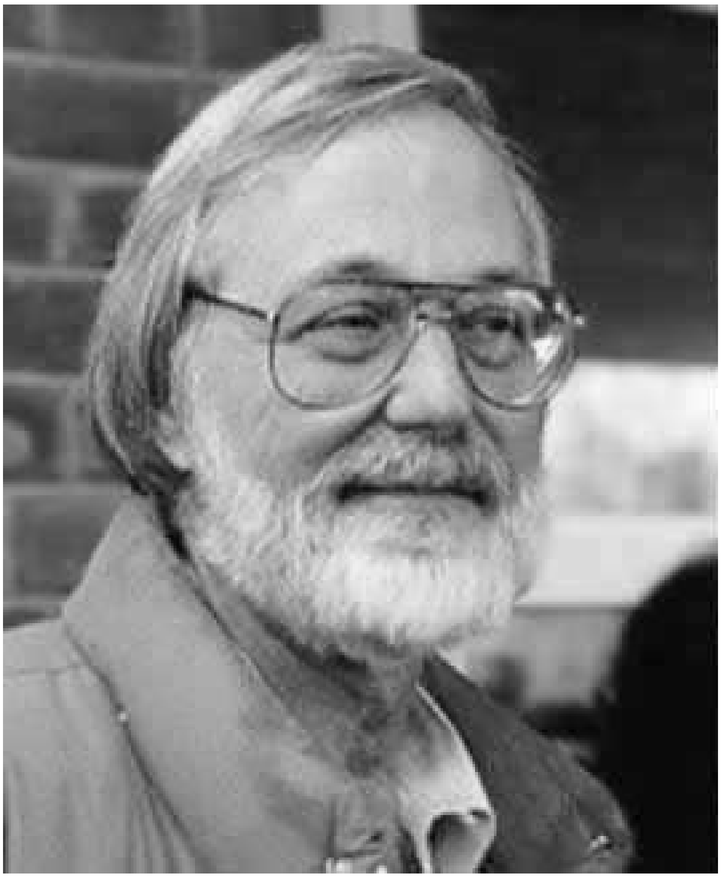
http://www-groups.dcs.st-andrews.ac.uk/history/Mathematicians/Lie.html



Saunders Mac Lane

No man could so stimulate others unless, alongside an incisive intellect, he was possessed of enthusiasm and warmth, a deep interest in his fellow man, and a sympathy the more real for being unsentimental. Those who proudly call themselves his friends know these things: others will infer them in reading [*his works*].

http://www-groups.dcs.st-andrews.ac.uk/history/Mathematicians/MacLane.html



John Milnor

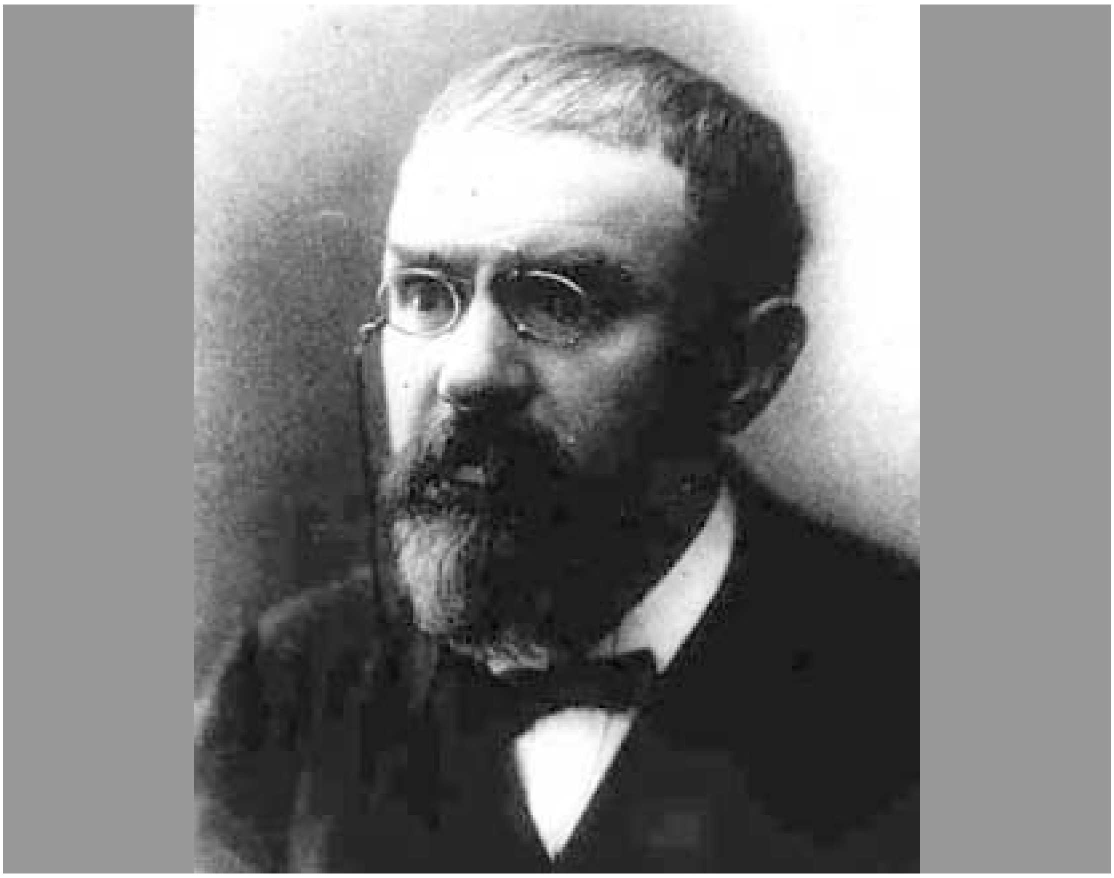
His most remarkable achievement, which played a major role in the award of the Fields Medal, was his proof that a 7-dimensional sphere can have several differential structures. This work opened up the new field of differential topology.

http://www-groups.dcs.st-andrews.ac.uk/history/Mathematicians/Milnor.html

Emmy Amalie Noether

Emmy Noether is best known for her contributions to abstract algebra, in particular, her study of chain conditions on ideals of rings.

http://turnbull.mcs.st-and.ac.uk/history/Mathematicians/Noether_Emmy.html



Jules Henri Poincaré

... to make geometry ... something other than pure logic is necessary.

To describe this "something" we have no word other than intuition.

http://www-groups.dcs.st-andrews.ac.uk/history/Mathematicians/Poincare.html

Lev Semenovich Pontryagin

At the age of 14 years Pontryagin suffered an accident and an explosion left him blind.

...of equal significance is the fact that his theorem enabled him to construct a general theory of characters for commutative topological groups. This theory, historically the first really exceptional achievement in a new branch of mathematics, that of topological algebra, was one of the most fundamental advances in the whole of mathematics during the present century...

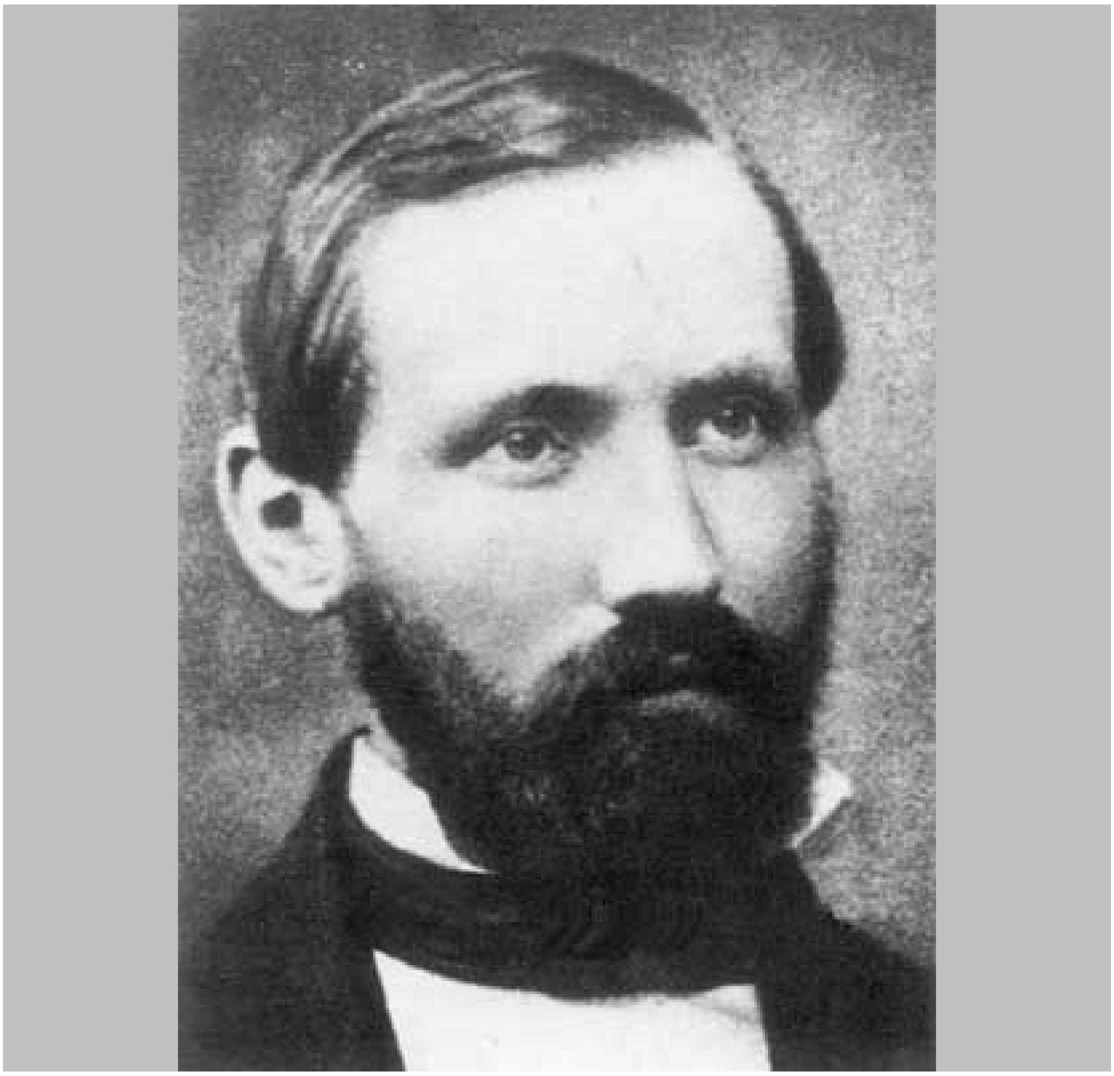
http://www-groups.dcs.st-andrews.ac.uk/history/Mathematicians/Pontryagin.html

Daniel Grey Quillen

Frank Adams had formulated a conjecture in homotopy theory which Quillen worked on. Quillen approached the Adams conjecture with two quite distinct approaches, namely using techniques from algebraic geometry and also using techniques from the modular representation theory of groups . Both approaches proved successful, the proof in the first approach being completed by one of Quillen's students, the second approach leading to a proof by Quillen.

Quillen received a Fields Medal at the International Congress of Mathematicians held in Helsinki in 1978. He received the award as the principal architect of the higher algebraic *K*-theory in 1972, a new tool that successfully used geometric and topological methods and ideas to formulate and solve major problems in algebra, particularly ring theory and module theory.

http://turnbull.mcs.st-and.ac.uk/history/Mathematicians/Quillen.html



Georg Friedrich Bernhard Riemann

In the mathematical apparatus developed from Riemann's address, Einstein found the frame to fit his physical ideas, his cosmology, and cosmogony.

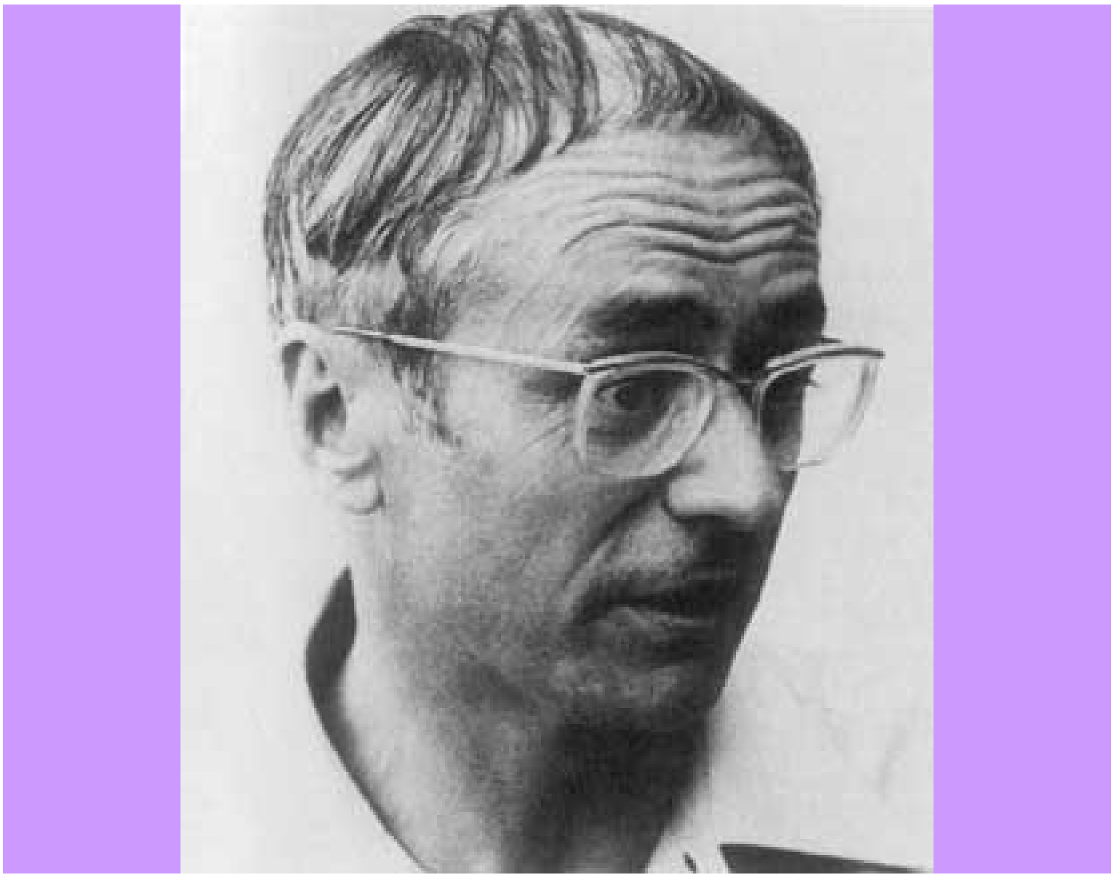
http://www-groups.dcs.st-andrews.ac.uk/history/Mathematicians/Riemann.html

Karl Johannes Herbert Seifert

Puppe describes the merits of the text "*Topology of 3-dimensional fibred spaces*":-

The book gives an excellent account of what was known in topology at that time. It was superior in contents and in ways of presentation to other books in the field not only when it appeared but for a long time to come. it was translated into several languages, and generation of topologists in all countries of the world studied it. Even now, more than 60 *years later, it is worth reading because of its lucid style and because, for some special problems, it is still the best source of information ...*

http://turnbull.mcs.st-and.ac.uk/history/Biographies/Seifert.html



Jean-Pierre Serre

Serre was awarded a Fields Medal at the International Congress of Mathematicians in 1954. Serre's theorem led to rapid progress not only in homotopy theory but in algebraic topology and homological algebra in general.

http://www-groups.dcs.st-andrews.ac.uk/history/Mathematicians/Serre.html

Stephen Smale

Smale was awarded a Fields Medal at the International Congress at Moscow in 1966. The work which led to this award was described by René Thom, see [9]. One of Smale's impressive results was his work on the generalised Poincaré conjecture.

The Poincaré conjecture, one of the famous problems of 20^{th}-century mathematics, asserts that a simply connected closed 3-dimensional manifold is a 3-dimensional sphere. The higher dimensional Poincaré conjecture claims that any closed n-dimensional manifold which is homotopy equivalent to the n-sphere must be the n-sphere. When $n = 3$ this is equivalent to the Poincaré conjecture. Smale proved the higher dimensional Poincaré conjecture in 1961 for n at least 5. (Michael Freedman proved the conjecture for $n = 4$ in 1982.)

Edwin Henry Spanier

In all, Spanier published moer than forty papers in algebraic topology, contributing to most to most of the major research areas in the field, including cohomology operations, obstruction theory, homotopy theory, imbeddability of polyhedra in Euclidean spaces, and topology of function spaces. Many of his results are now standard tools in all fields that untilize global geometrical reasoning. These include not only various subjects in pure mathematics, but also diverse areas in applied mathematics, including computer science, mathematical physics, economic models, and game theory. Interestingly, one of Spanier's theories, now called Alexander-Spanier homology, is currently being applied to analyse differential equations - a return to Poincaré's original use of algebraic topology.

http://turnbull.mcs.st-and.ac.uk/history/Mathematicians/Spanier.html

Norman Earl Steenrod

Algebraic topology underwent a spectacular development in the years following the second world war. From a position of minor importance, as compared with the traditional areas of analysis and algebra, its concepts came to exert a profound influence, and it is now commonplace that a mathematical problem is "solved" by reducing it to a homology-theoretic one. To a great extent the success of this development can be attributed to Steenrod's influence.

Steenrod spent five years Ann Arbor before accepting an offer from Princeton. He moved to Princeton in 1947 and remained on the Faculty there for the rest of his career.

http://www-groups.dcs.st-andrews.ac.uk/history/Mathematicians/Steenrod.html

René Thom

His work on topology, in particular on characteristic classes, cobordism theory and the Thom transversality theorem led to his being awarded a Fields medal in 1958. However, Thom feels that in some sense he did not deserve the honour [6]:-

... I have the impression that work was done just a little while later that was greater in depth and sagacity than mine and whose authors were quite as deserving, if not more so, of the medal (such as my co-medallist Klaus Roth). I am thinking too of Barry Mazur's demonstration of the Schönflies conjecture: Every sphere S^{n-1} in $\mathbf{R}^n$ with regular boundary is the boundary of an n-ball. Not to mention the discovery by Milnor of exotic spheres.

Egbert Rudolf van Kampen

Zariski had been working on the fundamental group of the complement of an algebraic curve, and he had found generators and relations for the fundamental group but was unable to show that he had found sufficient relations to give a presentation for the group. Van Kampen solved the problem, showing that Zariski's relations were sufficient, and the result is now known as the Zariski-van Kampen theorem.

http://turnbull.mcs.st-and.ac.uk/history/Mathematicians/Van_Kampen.html

Hermann Klaus Hugo Weyl

My work always tried to unite the truth with the beautiful, but when I had to choose one or the other, I usually chose the beautiful.

http://www-groups.dcs.st-andrews.ac.uk/history/Mathematicians/Weyl.html

John Henry Constantine Whitehead

Henry Whitehead was a topologist and differential geometer who is best remembered for his work on homotopy equivalence.

http://turnbull.mcs.st-and.ac.uk/history/Mathematicians/Whitehead_Henry.html