

Toposym 1

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Commemoration of Eduard Čech

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(Translated from Russian)

This Symposium, which has called together so many mathematicians specialising in general topology and associated fields, was initiated by the famous Czechoslovak mathematician Eduard Čech, one of the most outstanding exponents of this branch of mathematics.

We all feel deeply these sad moments when, instead of meeting prof. Čech in our midst and expressing to him our esteem for his work, we gather today to honour his memory.

In this brief session it is impossible to enumerate prof. Čech's scientific achievements — and unnecessary, indeed, since they must be familiar to all of us. I will therefore confine my remarks to the deep impression which Prof. Čech's work has made in mathematics.

His attention was not concerned solely with topology; together with Prof. G. Fubini of Bologna, he laid the foundations of projective differential geometry. However, let me speak only of Prof. Čech's topological papers.

These treat both general and algebraic topology. In general topology, Prof. Čech — together with Prof. M. H. Stone — discovered and defined the maximal compactification βX of any completely regular space X , and studied many of its interesting properties. In this connection, Prof. Čech also described a class of topological spaces now termed “complete in Čech's sense”. The compactification βX has assumed a central place in topology; and we meet it in almost every paper on general topology. But its importance has far surpassed the bounds of topology itself; it is becoming a fundamental concept of other branches of mathematics, e. g. in functional analysis. Next to investigations connected with compact extensions of topological spaces, Prof. Čech's important contributions to general topology concern dimension theory. He was the first to realise the significance of a dimension theory not confined merely to spaces with countable basis; and that the study of considerably more general spaces raises in dimension theory a series of problems — often quite specific — both extremely interesting and difficult. Prof. Čech gave the first formal definition of the so-called “large” inductive dimension, and initiated its systematic study.

Several other contributions to general topology are of interest; but the ones mentioned suffice to fix indelibly the name of Prof. Čech in this branch of mathematics.

Prof. Čech also made considerable contributions to algebraic topology. In 1937 he connected the Alexander-Kolmogorov product with the classical notion of intersection, and thus clarified the geometrical meaning of this first homological operation.

Other important papers concerned local homological invariants, local duality theorems and general homological invariants of topological spaces.

Prof. Čech perfected the general method of constructing homological invariants by nerves of refined sequences of finite coverings; he used, systematically, open coverings in place of the closed coverings employed thereto, and rid himself of all limiting assumptions on the spaces studied. He first defined in all their generality the groups now bearing his name.

It is necessary to mention another important contribution to algebraic topology; at the *International Mathematical Congress in Zürich* held in 1932, Prof. Čech presented a paper containing a definition of the groups now called homotopy or Hurewicz groups. Prof. H. Hopf recalled this at last year's *Colloquium on Algebraic Topology*, also in Zürich.

This definition did not meet with the attention it merited; in fact, the commutativity of these groups for dimensions exceeding one was criticised (this was unfounded, as we now know).

Thus, Prof. Čech's definition of the homotopy groups was, in 1932, simply not understood — a situation extremely rare in modern mathematics. We must express our admiration at the intuition and talent of Prof. Čech, who defined the homotopy groups several years before W. Hurewicz.

We meet in Prague, one of the main centers of general topology, in the country one of whose sons was Eduard Čech. The Czechoslovak topological school — whose outstanding members are known over the world — was founded by Prof. Čech. This school is a living tribute to Prof. Čech, the best his country could give him.