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Commemoration of Eduard Čech

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COMMEMORATION OF EDUARD ČECH

*Speeches of M. Katětov, M. H. Stone,
P. S. Alexandroff, K. Kuratowski*

M. KATĚTOV

(Translated from Czech)

We recall to memory today — almost one and a half years after his death — EDUARD ČECH, the greatest Czechoslovak mathematician, who produced exceptionally profound and fruitful ideas and results in such differing branches of mathematics as topology — general and algebraic — and differential geometry. There is one other reason why we should pay tribute to E. Čech on this occasion. It is the fact that he was really the initiator of the Symposium which commences with today's ceremony, although he did not live to see even the first preparations for it.

I should like to take this opportunity to mention some of the most important events in Čech's life.

Eduard Čech was born on the 29th of June, 1893 in Eastern Bohemia. After matriculation he began his studies in 1912 at the Charles University in Prague. He was forced to interrupt his studies during the war and completed them in 1920 when he presented a thesis on projective space, thus gaining the title of Doctor of Philosophy. He spent the years 1921—22 in Turin, where he worked with the outstanding Italian mathematician G. FUBINI. As a result of this most fruitful cooperation, two well-known books on projective differential geometry were published (in 1926 and later) under the joint authorship of Fubini and Čech.

In 1923 E. Čech was appointed docent at Prague University and a year later Professor of Mathematics at the newly founded University of Brno. In addition to this intensive work in differential geometry, E. Čech began — about the year 1928 — to get deeply interested in topology and to acquaint himself thoroughly with the current state of this discipline. His interest in topology gradually began to predominate. During the years 1930 and 1931, his last geometrical works of that period were published and in 1931 his first paper on topology appeared. In 1932 and 1933, he published his two fundamental works on algebraic topology — on the theory of homology in an arbitrary space and on the general theory of varieties and duality. During the period 1932—38, he published a number of further outstanding works, among them the well-known paper on the maximal compactification. About this period he visited Moscow and spent a year at the *Institute for Advanced Study* in Princeton. His lively personal contacts with Soviet, Polish and American mathematicians clearly date from this period.

After his return from the United States, E. Čech devoted much of his time to the training of young scientific workers. In particular, he led a *topological seminar* in Brno dealing with problems of general topology. This seminar which in a short time gave rise to a number of valuable results was attended by such mathematicians as BEDŘICH POSPÍŠIL, JOSEF NOVÁK, KAREL KOUTSKÝ and others. This work was unfortunately of short duration. After the Nazi occupation of Bohemia and Moravia in March of 1939 and the closing of all Czech centres of higher education in November of the same year, the seminar gradually ceased to meet and one of Čech's most gifted students B. Pospíšil perished at the hands of the Gestapo. After the liberation of Czechoslovakia in 1945, E. Čech returned to work with new enthusiasm as a convinced supporter of the progressive changes which were taking place in the life of our country. He moved to Prague University and from there to the present Mathematical Institute of the Czechoslovak Academy of Sciences. In 1954 he returned to a new position at the University. For several years he devoted much time and energy, on the one hand, to questions of the teaching of mathematics in which he had always had a great interest and, on the other, to organisational work. The successful foundation of the Mathematical Institute of the Czechoslovak Academy of Sciences was largely due to his latter activity. From the year 1949, he took up again his own scientific work. His main interest was, however, no longer topology, the development of which he naturally followed closely, but differential geometry where he again achieved outstanding results. The significance of his previous and new scientific work was acknowledged by the Government of the Republic by the granting of two *State Prizes* in 1951 and 1954. He was also decorated for his services by the President of the Republic with one of the highest *Orders* of the country.

As a result of his intensive and tireless work, Čech's health gradually became undermined. Despite the fact that during the latter years of his life he was seriously ill, he worked right up to his death on the 15th of March, 1960 to the utmost of his strength.

You will forgive me if I do not, on this occasion, make an analysis and appraisal of Čech's scientific contribution to topology. I should like only to mention some of the characteristics of E. Čech as a scientist and as a man and emphasise his significance for the development of mathematics in Czechoslovakia.

As far as I can judge — perhaps subjectively — one of the essential features of Čech's mathematical work was his ability to combine keen abstraction, deep analysis of concepts and an equally profound and spontaneous geometrical intuition and sense for the concrete. We may add still one more, perhaps less well-known, characteristic. It was his capacity for performing — patiently and with a sense for their real content — complicated and time-consuming computations, such as are often necessary in differential geometry. In view of these qualities, it is easier for us to understand how he could attain such successful results in such widely differing mathematical disciplines.

Čech's capability of abstraction, of detailed analysis of concepts until he had grasped their very essence, is clearly apparent in all his work, in particular in his

contributions on homology and on compactification. His sense for the concrete and for the geometrical content can be observed in his approach to those problems where he had to look for the real content behind a complicated formal apparatus and in the emphasis which he placed (and in which he also instructed his students) on the construction of “concrete” individual examples.

One further outstanding quality of Čech as a mathematician was his keen sense for the unity of mathematics, for the interdependence between different mathematical disciplines. Čech’s mathematical erudition was unusually wide and he tried to cultivate in his students an understanding of the unity of mathematics, a width and depth of mathematical knowledge.

Čech’s fine qualities as a mathematician were necessarily connected with his understanding of the social position and role of mathematics, of the social responsibility of the scientist. He was deeply convinced that science must serve social progress, of which it is one of the driving forces, that it is the moral responsibility of the scientist to be an active citizen of this country and to take up on the complex problems of world development an equally responsible and decisive standpoint as he does to his own work. For this very reason, Čech devoted so much energy to organisational and pedagogical questions and, although himself remote from applications, actively advocated the speedier development of applied mathematical disciplines in our country.

Eduard Čech was in fact the first Czechoslovak mathematician (followed, it is true, by several others of his generation) to make a fundamental contribution to world mathematics and, in his particular branch, influenced scientific work in other countries. It may be said that with E. Čech Czechoslovak mathematics assumed an active place in the general stream of world development of mathematical science. There can be no doubt that this fact in turn had a beneficial effect on the level of mathematical work in Czechoslovakia.

E. Čech influenced directly or indirectly the larger part of the middle and younger generation of our mathematicians. In some cases, this took the form of a direct scientific influence, in other, no less important cases, of a general approach to mathematics and its problems. I should like to mention once again Čech’s Brno seminar, which remains for us till today a model of the systematic work of a scientific team. Undoubtedly, Čech’s influence will be felt for many years to come on the mathematical life of our country.

In many respects E. Čech presents us with an example difficult to emulate. His devotion to science knew no bounds. We shall always admire his exemplary diligence, the undaunted spirit with which he firmly upheld his views — arrived at on the basis of careful consideration — both in discussion and in practice. We mathematicians can only aim at emulating his creative enthusiasm, his keen penetration to the essence of a problem, his fundamental conception of mathematics as a whole. As citizens of this country and as scientists we have his example as a worker in the cause of science and progress which he considered to be — as in fact they are — inseparable and indivisible.