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NEWS and NOTICES

1981 — THE BICENTENARY OF BERNARD BOLZANO

JIŘÍ JARNÍK, ŠTEFAN SCHWABIK, Praha

The Prague mathematician, logician and philosopher, Professor of the Prague University Bernard Bolzano (5 October 1781 – 18 December 1848), was one of the personalities, whose anniversary was included by the UNESCO in the list of world cultural events in the year 1981. The Czech mathematical community has not often been offered participation in such actions which may arouse interest of the general public. It can be said that in this case the opportunity was exploited both to acquire deeper knowledge of Bolzano's mathematical work, especially in the less traditional directions, and to acquaint the interested public, especially workers from other branches of science, with the personality of Bernard Bolzano and with his part in the history of Mathematics in particular and Science in general.

If we examine the activities which took place in 1981 in connection with the bicentenary of Bernard Bolzano, we are favourably impressed by their extent as well as by the number of institutions which took part in the individual events. The principal role in the scientific part of the commemorations was naturally played by the Czechoslovak Academy of Sciences with the attached learned societies and by Charles University; nonetheless, a number of other institutions participated, for instance the Club for the Old Prague, Federal Ministry of Communications and the Department for Anthropological Research of the National Museum in Prague.

In the year 1981, three conferences devoted to Bernard Bolzano took place in the Czech Socialist Republic. The most important of them was the international conference *Impact of Bolzano's epoch on the development of science.* This conference made a successful effort of presenting a more global view of the period in which Bolzano lived and worked, a period of profound and impetuous social changes and unprecedented progress in science and technology. The national conference *Bernard Bolzano – his period, life and work* was devoted to the detailed investigation of various aspects of Bolzano's life and his influence on the Bohemian society in the first half of the 19th century.

The third event was the Conference of Czech Mathematicians, organized by the Mathematical Scientific Section of the Society of Czechoslovak Mathematicians and Physicists in Zvíkovské Podhradí, 9–11 February 1981. Here, naturally, interest was focussed on Bolzano's work in Mathematics, namely, in mathematical logic and theory of sets, in geometry, and in mathematical analysis.

The lecture by David Preiss on mathematical analysis was devoted to the branch of Mathematics in which Bolzano's results have been relatively well known for more than five decades, thanks to Prof. Jašek from Plzeň and to professors of Prague Universities K. Petr, K. Rychlík and V. Jarník: the theory of functions, particularly the problem of continuous functions without derivative. Therefore, the lecture concentrated more on the later developments in this field. The lecture by Petr Simon took into account some more recent views on Bolzano's geometrical studies and showed how Bolzano essentially anticipated such notions as for example the topological dimension. Finally, Petr Vopěnka discussed mainly Bolzano's essay *Paradoxien der Unendlichen*, which belongs to the few Bolzano's works that had opportunity to affect the development of Mathematics immediately after his death. The lecture demonstrated Bolzano's deep concern for fundamental questions of the structure of Mathematics and, on the other hand, the influence of his philosophical and theological opinions on his mathematical considerations. Jaroslav Folta in his lecture gave a picture of Bolzano's life and his activities.

Two scientific conferences were organized in Czechoslovakia in the bicentennial year of Bernard Bolzano, namely, EQUADIFF 5 in Bratislava (differential equations and their applications) and TOPOSYM in Prague (topology). Also at these conferences, as well as at the congress of the Societies of Czechoslovak and Slovak Mathematicians and Physicists in Karlovy Vary, a tribute to Bernard Bolzano was paid.

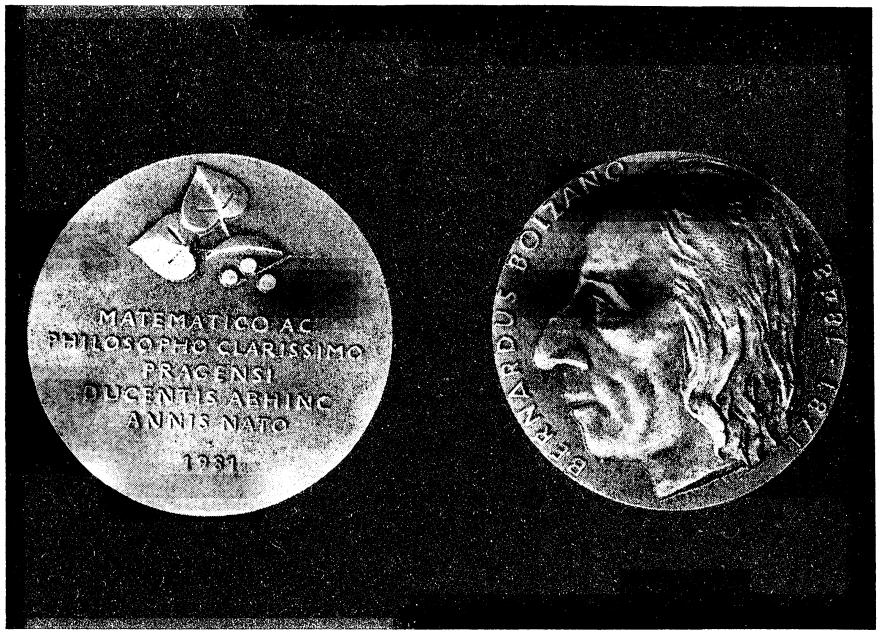
Naturally, such a significant anniversary was commemorated also by publication of a number of works of both general and scientific character. Among them, we find first of all several reprints of works of Bernard Bolzano.

For mathematicians, the most atrractive publication probably is the reprint of Bolzano's early mathematical works (B. Bolzano, *Early Mathematical Works*. Ed. L. Nový. Acta historiae rerum naturalium necnon technicarum, special issue 12, Prague 1981). This volume contains five mathematical essays by Bolzano: *Betrachtungen über einige Gegenstände der Elementargeometrie* (1804), *Beyträge zu einer begründeteren Darstellung der Mathematik* (1810), *Der binomische Lehrsatz ...* (1816), *Rein analytischer Beweis ...* (1817), *Die drey Probleme der Rectification, der Complanation und der Cubirung ...* (1817). The introduction, written by L. Nový and J. Folta, includes among other interesting remarks on some less famous contemporaries of Bernard Bolzano, as well as on Bolzano's relations to some prominent mathematicians of his time: Gauss, Cauchy, Lobachevskiĭ.

Though Bolzano passed all his life in Bohemia, he wrote all his works in German. Therefore, it should be appreciated that several translations have made his works easily accessible to the Czech reading public. These include anthologies from his *Wissenschaftslehre* and from his philosophical works, as well as his Utopian essay *Von dem besten Staate* and his autobiography. For bibliographical data on these translations, as well as for a more detailed account of publications about Bolzano which appeared in connection with his anniversary in the Czech language, we refer

the interested reader to Časopis pro pěstování matematiky, *107* (1982), pp. 196–202.

Here we should like to mention only one volume which is of unquestionable interest from the mathematician's point of view. This is *Bolzano and the foundations of mathematical analysis* by Vojtěch Jarník, which was published by the Society of Czechoslovak Mathematicians and Physicists both in Czech and English versions. In addition to an introductory biographical article by Jaroslav Folta, it includes



four essays by V. Jarník, discussing the contribution of B. Bolzano to the foundations of mathematical analysis. These essays, which originally appeared in Czech in various journals during a period of 40 years (1922–1961), have thus become available to foreign readers, as well as to the young generation of Czechoslovak mathematicians.

The commemoration of Bernard Bolzano also aroused interest in his physical remains. The doubts concerning the precise place of his last rest led to an investigation of the grave at the Prague cemetery Olšany, where his remains had rested together with those of his pupil F. Schneider. This research was pursued by MUDr. Emanuel Vlček, DrSc., from the National Museum in Prague, and its main results appeared in the daily press. The tomb was then rearranged by care of the Czechoslovak Academy of Sciences and the Club for the Old Prague.

Bolzano's home for the major part of his life was Prague, namely the house of his parents at Marian Square (now Mayor V. Vacek Square), and towards the close of

his life the house of his brother in Celetná Street No. 190/I. The former no longer exists; on the latter, a memorial tablet, work of the sculptor J. Krištůfek, was placed. Bolzano's second home, after his dismissal from the Prague University, was the manor-house of the Hofmann family in Těchobuz in Southern Bohemia; also here a memorial tablet was unveiled. As a tribute to Bernard Bolzano, a commemorative medal (the sculptor J. Linhartová-Pospíšilová) was coined under the auspices of the

Institute for Czechoslovak and World History, Czechoslovak Academy of Sciences, and a stamp with the portrait of Bernard Bolzano by the National Artist K. Svolinský was issued.

Undoubtedly, Bernard Bolzano was a great personality in the Bohemian society of the first half of the 19th century. His firm ethical principles, aversion to undeserved privileges and enlightened belief in the human reason gained him a great number of followers and supporters but, on the other hand, influential enemies. The impact of his scientific efforts – and this concerns especially Mathematics – was naturally much smaller: his isolation, particularly after his compulsory departure from the University, together with his own estimation of importance of individual components of his work, caused that his results in no substantial way affected the further development of science. It is clear that the present investigation of Bolzano's work cannot bring any new mathematical knowledge. We turn to Bolzano's heritage

in order to evaluate his contribution to the Mathematics of the first half of the 19th century, and also in order to recognize and understand his part in the period that is not so remote as it may seem at first sight: after all, Bolzano's lifetime was framed by the abolition of serfdom in 1781 and the great revolutionary outbursts of 1848. He lived through the Great French Revolution and the Napoleonic Wars. And the development of technology in Bolzano's time can be illustrated by a surely incidental but yet characteristic fact: the years 1781 and 1848 are the dates not only of Bolzano's life, but also of the great inventor and founder of railways George Stephenson.

The bicentenary of birth of Bernard Bolzano therefore was a useful occasion not only for a critical look at Bolzano's personality and work, but also for a reflection on the contribution of a scholar and teacher to the progress of the society.