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THE COLLECTED PAPERS OF

Albert Einstein

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THE EARLY YEARS, 1879–1902

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A handwritten signature in black ink, appearing to read 'A. E.', with a small flourish at the end.

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MATURA EXAMINATIONS AT THE GEWERBESCHULE, AARGAU KANTONSSCHULE

In September 1896, Einstein and his fourth-year classmates in the *Gewerbeschule* took the secondary-school leaving examination (*Maturitätsprüfung*), often abbreviated *Matura*.^[1] Passing the examination was important to his plans: a leaving cer-

^[1] Ten pupils registered to take the examination, the nine in Einstein's class and a pupil in the third-year class. The latter apparently withdrew before examination time (see Gottlieb Käppeli, Erziehungsdirektor, Canton

of Aargau, to Hermann Bleuler, Präsident, Schweizerischer Schulrat, 9 September 1896; and the list of pupils taking the examination, both in SzASa, Erziehungsdirektion 1896, Mappe Ks. 5, no. 2270).

tificate (*Maturitätszeugnis*) from the *Gewerbeshule* would allow him direct admission to the ETH.^[2]

A pupil taking the *Matura* submitted a short vita and indicated what professional school he planned to attend.^[3] Einstein and the other candidates had to do so by 8 September 1896.^[4] The Rector forwarded this material, together with the grades for the last quarter, to the Aargau Department of Education (*Erziehungsdepartement*). The Department decided on the pupils' admission to the *Matura* and sent the papers to the three-member Examination Commission (*Prüfungskommission*) that supervised the examination.^[5]

The *Matura* consisted of a written and an oral portion, each prepared and administered by teachers of the *Gewerbeshule*. The seven written examinations took place on 18, 19, and 21 September. In mathematics three problems were to be given. In 1896 two were in geometry (see Doc. 23) and one in algebra (see Doc. 26). Pupils could consult logarithm tables and a dictionary could be used in the foreign-language examination (in Einstein's case, in French).^[6] The examinations were graded by the examiners and then forwarded to the Rector, who passed them on to the Examination Commission.

Oral examinations, open to the public, were held on 30 September in the presence of the Examination Commission. Each pupil was examined for at least ten minutes on each subject of the written examination and on history and descriptive geometry. As usual, two representatives of the ETH were present at the orals. That year they were Johann Jakob Graf (1854–1925), Professor of Sculpture and Drawing, and ETH director Albin Herzog (1852–1909), Professor of Mechanical Engineering,^[7] who had earlier taken part in Einstein's unsuccessful ETH entrance examination.

Immediately after the orals, the examiners, the Rector, and the Commission met to decide the final grades. Although the decision was made by the Commission, the examiners had an advisory role and the right to propose grades in their subjects.

[2] See the agreement of 10 March 1860 between the Swiss Federal School Council and the Aargau Department of Education, recorded on 18 May 1860 in the SzZE Schulratsarchiv, Präsidialprotokoll 1860, no. 150. As a rule, in German-speaking countries, secondary-school pupils planning further education would take the *Matura* (or the equivalent *Abitur*). Successful completion of this examination demonstrated mastery of subjects deemed necessary for study at a university or technical university.

[3] Unless otherwise noted, the sources for all information on *Matura* procedures are *Matura-Reglement 1893* and *Matura-Programm 1896*.

[4] Einstein's letter is Doc. 20.

[5] In 1896 the Commission members were

an engineer, a pharmacist, and a manufacturer, all from the canton (see Gottlieb Käppeli, *Erziehungsdirektor, Canton of Aargau, to Rektorat, Kantonsschule, 14 September 1896*, SzASA, *Erziehungsdirektion 1896*, Mappe Ks. 5, no. 2057).

[6] For the subjects and times of Einstein's written examinations, see Docs. 21–27. In one case (physics), the examiner indicated that Einstein came late and finished early. Written examinations on English or Italian (one was obligatory) and on geography were administered at the end of the third and second years, respectively (see Doc. 19 for Einstein's grades). Since Einstein did not attend the second year, it is unclear how his grade in geography was assigned.

[7] See *Aargau Programm 1896/97*, p. 16.

Course work was also taken into account; it formed the sole basis for the grades in drawing and technical drawing.^[8]

All nine candidates passed and six entered the ETH,^[9] Einstein's grade average for the written examination was $5\frac{1}{3}$, out of a possible 6, the highest average in his class.^[10]

^[8] See Doc. 19 for Einstein's grades in these two subjects.

^[9] See *Aargau Programm 1896/97*, p. 16.

^[10] See Docs. 21–27 for his written grades.

He received 6 (the highest mark) in his oral examinations in history and descriptive geometry (see his secondary-school leaving certificate).