

cated to Von Zach in the course of the year 1801, and enabled him and Olbers to rediscover the first of the small planets, Ceres, which Piazzi had observed on the 1st of January 1801 at Palermo, and afterwards lost as it approached the region of the sun's light. Through this Gauss placed himself on a level with the great French astronomers Laplace, Lalande, and others. The new professor of mathematics and director of the observatory of Göttingen was admitted into the august company of the Paris academicians, who then ruled, and since the death of Euler had almost monopolised, the mathematical studies of the world. Although Gauss thus introduced the higher and abstract branches of exact science into the programme of a German university, and established a link between Paris and Germany in mathematics, as Humboldt had done shortly before in the natural sciences, fully a quarter of a century was to elapse before the spirit of exact research, and of the higher mathematics, really began to leaven the German universities. It then at length entered the field as a third and equally important agent by the side of the

16.  
Scientific  
spirit enters  
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sities in the  
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century.

This was achieved to perfection, a proof of the usefulness of the method being the fact that Gauss succeeded in finishing in one hour a calculation which had taken Euler three days, and had resulted in his blindness. The second problem arises from the fact that the number of observations is always in excess of the number mathematically necessary, and that, owing to the unavoidable inaccuracies, different sets of observations give slightly different orbits. How are these to be used so as to give the

most correct average result? This involves a question in probabilities. As early as 1795 Gauss was in possession of the so-called method of least squares, which occurred to him so naturally that he suspected that Tobias Mayer must have already known about it. It also occurred independently to Legendre, who was the first to publish it, in 1806, in his 'Nouvelles méthodes pour la détermination des orbites des comètes.' See Sartorius, 'Gauss zum Gedächtniss,' p. 41 sqq.