infinite series. The solution of an equation being called finding its roots, it was for a long time assumed that every equation has as may roots as are indicated by its degree. A proof of this fundamental theorem of algebra was repeatedly attempted, but was only completed by Gauss in three remarkable memoirs, which prove to us how much importance he attached to rigorous proofs and to solid groundwork of science. The second great doctrine in which the conceptions of the continuous and the infinite presented themselves was the expansion of mathematical expressions into series. In arithmetic, decimal fractions[1] taken to any number of terms were quite familiar; the infinite series presented itself as a generalisation of this device. A very general formula

15. Doctrine of series. Gauss.

'Werke,' vol. iii. pp. 1 and 71). A very good summary of this proof is given by Hankel ('Complexe Zahlen-Systeme,' p. 87). A purely algebraical demonstration of the same theorem, not involving considerations of continuity and approximations, was also given by Gauss in the year 1816, and reproduced by others, including George Peacock, in his 'Report,' quoted above, p. 297. Hankel (*loc. cit.*, p. 97) shows to what extent Gauss's proof supplemented the similar proofs given by others before and after.

[1] Decimal fractions seem to have been introduced in the sixteenth century. Series of other numbers, formed not according to the decimal but to the dyadic, duodecimal, or other systems, were known to the ancients, and continued in use to the middle ages. The dyadic system was much favoured by Leibniz. It was also known that every rational fraction could be developed into a periodical decimal fraction. Prominent in the recommendation of the use of decimal fractions was the celebrated Simon Stevin, who, in a tract entitled 'La Disme' attached to his 'Arithmétique' (1590, translated into English, 1608), described the decimal system as "enseignant facilement expédier par nombres entiers sans rompus tous comptes se rencontrans aux affaires des hommes." Prof. Cantor ('Gesch. der Math.,' vol. ii. p. 616) says, "We know to-day that this prediction could really be ventured on—that indeed decimal fractions perform what Stevin promised." At the end of his tract he doubts the speedy adoption of this device, connecting with it the suggestion of the universal adoption of the decimal system. The best account of the gradual introduction of decimal fractions is still to be found in George Peacock's 'History of Arithmetic' ('Ency. Metrop.,' vol. i. p. 439, &c.)