XXIII. "Fourth and concluding Supplementary Paper on the Calculation of the Numerical Value of Euler's Constant." By WILLIAM SHANKS. Communicated by Professor STOKES, Sec. R.S. Received June 14, 1869.

When $n=10000$, we have

$1+\frac{1}{2}+\frac{1}{3}+\ldots\frac{1}{10000}=$

9·78760 60360 44382 26417 84779 04851 60533 48592 62945 57772 17183 89460 97673 221+

Log ϵ $10000+\frac{1}{20000}=$

9·21039 03719 76182 73607 19658 18737 45683 04044 05954 51509 19041 33305 21764 185+

Result of "Bernouilli's" $=+$

·00000 00008 33333 33250 00000 03968 25392 65873 02344 87732 37845 49617 88207 355, &c.

E=

·57721 56649 01532 86060 65120 90082 40243 10421 59335 93995 35988 05773 64116 391.

On comparing the value of E when n is taken 10000, with former values already given, we cannot but conclude that the limits assigned to the value of E in the Third Supplementary Paper have been confirmed, and that nothing more seems requisite as to the determining of the numerical value of this curious constant.

XXIV. "On the Refraction-Equivalents of the Elements." By J. H. GLADSTONE, Ph.D., F.R.S. Received June 17, 1869.

(Abstract.)

This paper is a continuation of the researches on refraction which have been already published by the author in conjunction with the Rev. T. Pelham Dale*.

It is divided into two parts—the data, and the deductions. The data consist of the refraction-equivalents of some simple and many compound bodies, calculated from the indices observed by various chemists and physicists, or by the author himself; together with a series of observations on about 150 salts in solution. The method of examining these, and the nature of the inference to be drawn from such experiments, have already been explained in the Proceedings of the Royal Society, 1868, pp. 440–444.

The deductions consist of a comparison of the evidence bearing on each elementary substance, beginning with carbon, hydrogen, and oxygen, which were in the first instance determined by Landolt. In the case of some elements all the means of calculation lead to the same number within probable errors of experiment; but in the case of others two or more

* Phil. Trans, 1863, p. 317.