every facility possible is afforded for the emptying of the vessels of these processes. He hence infers that the office of these processes is to allow of the displacement of fluid when the lens is carried forwards; and when the choroid muscle ceases to act, by the re-distension of their capillaries, to carry the lens back into its place. The author then enters into a mathematical examination of the data furnished by these facts, to show how exactly they fulfill the conditions necessary for adapting the eye, viewed as an optical instrument, to distinct vision at different distances. The author considers that there is no analogy either in structure or function between those fibres in mammals occupying a situation similar to that occupied by a true muscle in Birds (the ciliary muscle), but that the true analogue of the ciliary muscle in birds is the choroid muscle in mammals, the chief difference between them being in situation. In the Pigeon, he finds that the ciliary muscle is inserted into the choroid coat, along which it can be traced as far back as about $\frac{1}{8}$th of an inch behind the iris, so that its action would be to draw the choroid tense upon the vitreous humour, and thus to compress it similarly to the choroid muscle in the mammal. Besides, in the Bird he finds no muscular fibres at the posterior part of the choroid. The ciliary muscle is more distinct, and appears to be stronger than the choroid, but this the author attributes to the fibres of the one being much more collected, and therefore limited to a much smaller space than those of the other.

February 6, 1851.

GEORGE RENNIE, Esq., V.P., in the Chair.

A paper was read, entitled "On the Supply of Water from the Chalk Stratum in the neighbourhood of London." By John Dickinson, Esq., F.R.S. Received January 6, 1851.

The object of this paper is to explain and illustrate the supply of subterranean water which is always found at certain depths in the chalk strata; the circumstances that influence its natural outflow by springs and rivers; the practicability of draining off that water by an artificial mode of exhaustion; and the changes that would be produced by carrying such an operation into effect on a large scale.

It is stated, that numerous perennial streams issue from the elevated ridges of the chalk strata, those in Kent and Surrey flowing from south to north, and those in Buckinghamshire, Herts and Essex, flowing from north to south; and that in each case the dip of the strata corresponds with the fall of the country and the direction of the streams. These rivers are considered to be the natural outflow of the rain-water imbibed by the chalk, the accumulation of which, as explained by Dr. Buckland, is in a subterranean reservoir; and according to the periodical filling and exhaustion of this, the springs and streams alternately decrease and are augmented. The circumstances regulating this change, which have been observed and

experimented upon by the author during the last forty years, are explained in the paper. In the year 1835, he adopted a method of ascertaining the supply of subterranean water, by the use of a very simple but effective instrument, contrived and used by the late Dr. Dalton for that purpose; and he has supplied a series of monthly observations, extending over fourteen years, both of the rain falling on the surface, and of that which is found to percolate through to a lower level for the supply of springs and rivers.

From his observations—

	inches.
The annual average of rain in the north-western part of Herts is	25·92
The average fall of rain in the first six months of the year is	11·12
The average from July to December inclusive	14·80
The average in six months, from April to September inclusive	12·17
The average percolation through the Dalton gauge, from April to September inclusive, is	0·62
And from October to the following March inclusive	9·61
Total average annual amount of percolation	10·23

The rivers and springs supplied from the chalk are generally found to be in fullest flow about June, and to be most reduced in December; and the cause of this variation is considered to be the time that the descending rain requires to percolate through the crevices and fissures of the lofty chalk hills, and to spread laterally in the reservoirs till it reaches the outlet springs.

The variation in the quantity of rain is found to range from 21·10 inches to 32·10 inches. The variation in the amount of percolation is found to be far greater, viz. from 3·10 inches to 19·28 inches. Consequently there is a variation in the springs, and in the flow of the rivers, much greater than in proportion to the fall of rain. The author shows that the season of the rain falling is the main incident in the supply of these perennial springs; and that their outflow is proportional to the percolation which takes place during winter into the lower beds, the summer rains being evaporated or taken up by vegetation.

He gives it as his opinion, that it is possible to drain off, by artificial means, great part of any river flowing out of the chalk; such rivers being truly the natural drain and outlet of the subterranean reservoir therein. He shows, by precise measurements and carefully recorded observations, that the subterranean water has a movement, with a declivity of 13 feet 6 inches to the mile, in the direction of the dip of the strata and of the fall of the streams; and he states that the crevices or water-channels in the chalk are larger in the neighbourhood of a stream. He therefore assumes that if a large and deep well were sunk in any such locality, and the water in it, by being pumped off by steam-power, were brought down to and kept at a lower level, a deep-seated artificial vent being thus formed, the water would be so drained off from the reservoir that the springs would be dried up, and the river be partially or entirely deprived of its flow of water.