appeared to me desirable at once to ascertain whether or not the moist contents of the egg lost water by evaporation through the calcareous shell; for if this be the case to any appreciable extent, the constitution of the albumen within cannot possibly remain for any length of time fixed and definite, although the egg itself may, during this period, be perfectly preserved from organic decomposition.

My affirmative anticipations on this point were based upon the circumstance that a new-laid egg exhibits no cavity on breaking the shell, whilst a stale one always contains a considerable air-space; however, to set the question at rest, I made the following experiments:—The weight of a hen's egg was exactly taken, and it was then supported upon a wire tripod-stand, so that the air might have free access to the whole external surface of the shell. Upon weighing the egg after an interval of twenty-four hours it had lost exactly one grain, and this ratio of loss by evaporation remained tolerably constant during several days. As, however, the experiment was made in the winter time, and during a season of wet weather, I repeated it under somewhat modified conditions. Two new-laid eggs of large size were taken, and, after their weights had been accurately determined, they were supported in a similar manner within a bell-jar, resting on a flat glass plate, with a dish of concentrated sulphuric acid to absorb the water given out by the eggs. The whole arrangement (that is to say, the dessicator and its contents) was placed in a room the temperature of which was maintained pretty uniformly between 55° and 60° Fah., and there left for six weeks, the diminution of weight being frequently observed during this interval. In all, ten weighings were taken, and the results proved that 100 grains, or more, of water can be abstracted under these circumstances, whilst the loss in the intermediate periods followed a diminishing scale, but nearly coincided with the several intervals of time. The average loss of water by evaporation through the shell may be stated, for the two eggs operated upon, to have been at the rate of 2 and 2½ grains respectively per diem. Upon breaking the eggs at the end of six weeks, one was found perfectly sweet and good, with the envelope of the yolk unbroken, but the second and smaller one was discoloured next the shell, and the albumen had become slightly decomposed. The last results with this egg were consequently disregarded.

The details of the experiments are quoted, for they serve to show the proportion of yolk to white at the final stage; ratio of water evaporated to total liquid contents; and the exact weight, in each instance, of the shell with its lining membrane, after careful washing with dilute ammonia and subsequent drying in the air:—

Egg—No. 1.

Original weight (entire)	975·0	grains
Loss of weight in six weeks (water)...	100·0	,,
Shell and membrane...	99·2	,,
Yolk	317·2	,,
White (by difference)	458·8	,,

Egg—No. 2.

Original weight (entire)	930·6	grains
Loss of weight in three weeks (water)	41·6	,,
Shell and membrane...	85·2	,,
Yolk and white	803·8	,,

It will here be noticed as an anomaly that the heavier shell of No. 1 egg permitted a faster rate of evaporation through its substance than No. 2. The latter appeared, however, upon inspection, to have a smoother external surface, and to be stronger and more compact in structure throughout.

The following table shows the actual amount of water lost by evaporation in the two instances for the intervals of time specified in the first column.

Loss of Weight in Dessicator (Water evaporated).

Intervals of time. Days.	No. 1 Egg. Grains.	No. 2 Egg. Grains.
1	3·4	2·6
2	6·9	4·7
7	17·3	14·0
14	34·3	27·6
21	51·1	41·6
42	100·0	——

Ratio of Water Evaporated to Total Liquid Contents of the Egg (per cent.).

Time.	No. 1.	No. 2.
In two weeks	3·9 ...	... 3·3
three ,, ...	5·8 ...	... 4·9
six ,, ...	11·4 ...	... ——

It would be difficult to prove whether or not the water lost by evaporation from the white is partly compensated by an accession of water, by diffusion, from the yolk. No colouring matter travels outwards unless an organic decomposition sets in, when all the natural barriers are destroyed, and the several parts of the egg become merged. I am inclined to think that this re-distribution of water actually occurs, since the *sac* of the yolk appears wrinkled in a stale egg, as though by loss of a portion of its liquid contents.

The composition of fresh egg-albumen may be said to vary between the following limits:—

Water	88 to 85 per cent.
Dry albumen (containing nitrogen 1·55 to 1·75 per cent.) ...	12 to 15 ,,

Other analyses have been recently published, in which the nitrogen amounts to 1·81 per cent. and upwards, with the minimum proportion of water. It is probable that these latter results were obtained with eggs which had been longer kept in stock.

The indications of change in the composition of egg-albumen by evaporation of moisture are not, perhaps, so decisive as to interfere greatly with the ordinary operations followed in the manufacture of albuminized paper; the protracted exposure of large surfaces of diluted albumen in shallow dishes left freely open to the atmosphere of heated rooms must induce a more rapid increase in concentration of the albumen than is ever likely to occur as the result of the natural dessication of the egg. The relation subsisting between the yolk and white in different eggs appears to vary between somewhat wide limits; and the most remarkable monstrosity that ever came under my notice was a double egg, united at the smaller extremities by a membranous ligature, and without any shell; the one *sac* containing all the yolk, and the other only the white. This was laid by a hen belonging to a member of our staff, and we have had it since August, 1866, preserved in spirit. It lost water rapidly during the short interval previous to immersion, and the yolk half seemed from the first to be less expanded than the twin *sac*. From the circumstance that it remained so in any position we inferred that there was no communication between the two receptacles. It should be mentioned, in conclusion, that these latter were of the ordinary size. I send you a stereo photograph of this interesting object.

THE NEW PHOTOMETER.

BY DR. VOGEL.

My new photometer is intended for measuring the time of exposure for negatives in all the photographic processes in which the image is not obtained by direct operation, but is brought out afterwards by a development; such processes, for instance, as the carbon printing process (one of the most important applications of the instrument), enamel process, aniline printing process, photo-lithography, for the production of negatives, &c.

The photometer consists in a transparent scale, made from a prepared paper, graduated in strips, the thickness increasing in an exact mathematical proportion from one end to the other. Under this scale is exposed a strip of bichromated paper—Saxe paper, immersed in a 1·30 solution of bichromate of potassium for two minutes, and dried afterwards. This