

*On the Microscopic Observation of Minute Objects.*—Prof. FRAZER remarked, that he desired simply to put on record a thought relating to Helmholtz's now famous establishment of the limit of vision through the microscope. As this limit was determined by half the length of a wave of light and since the wave-lengths of the most refrangible rays of the light spectrum (*i. e.* the violet) are somewhere near the 1-57000th part of an inch, the conclusion was reached that nothing more minute than the 1-114000th part of an inch could be seen. But actinic waves or others of smaller length (of greater refrangibility too) in passing through a substance on which are lines or other markings less than 1-114000th inch apart, may be altered to light waves, and become visible, provided, that the substance through which they pass is capable of fluorescing, *i. e.*, increasing their wave length, and provided the distance apart of the marks to be seen is not less than one-half the wave length of such actinic waves.

The meeting having adjourned until May 16; the following were then elected members of the Council:—

For three years—Edw. S. Whelen, R. S. Kenderdine, M.D., J. H. Redfield, J. G. Hunt, M.D.

For two years—Geo. H. Horn, M.D., Jos. Wharton, Jos. Jeanes, Geo. A. Kœnig.

For one year—Geo. Vaux, J. S. Haines, W. H. Dougherty, Harrison Allen, M.D.

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MAY 16.

The President, Dr. RUSCHENBERGER, in the chair.

Thirty-four members present.

*The "Sleep of Plants" as an Agent in Self-Fertilization.*—Mr. THOMAS MEEHAN said that what is popularly known as the "sleep of plants," the closing of some kinds of flowers at nightfall, though a matter within common observation, had not, so far as he was aware, been made a subject of physiological investigation, with the view of ascertaining the value, if any, of this kind of motion in the economy of plant life. He had recently discovered that by means of this peculiar motion the common *Claytonia Virginica* and some butter-cups were fertilized by their own pollen. The fertilization of these plants had been somewhat of a mystery to him, as, in view of some prevailing theories of cross-fertilization by insect agency, these plants ought not to be self-fertilizers; but from repeated observation he was satisfied that no insects had visited plants that had yet seeded abundantly. Watching the process of fertilization in *Claytonia*, he found the stamens on

expanding fell back on the petals expanded during daylight. At night, when the flower closed, the petals drew the anthers up in close contact with the pistils. Cross fertilization could be accomplished by insects if they visited the flower, but they did not; and actual fertilization only occurred in this way. In many cases, especially in the advance of the season, the stamens recurve so much as to be in a measure doubled up by the nocturnal motion of the petals. The anthers were not drawn into contact with the stigmas in these cases, and the flowers were barren as the result.

In the *Ranunculus bulbosus*, our common butter-cup, in the evening following the first day's expansion of the young flower, the immature anthers and the young stigmas would be found covered with pollen grains. The inference would generally be that this had been carried there by insects. But as he had been especially on the lookout for insects as visitors to the butter-cup, and feeling sure that none of any consequence had been to them, he examined these flowers carefully, and found that on the first expansion of the flower a single outer series of stamens burst their anther-cells simultaneously with the expansion of the flower, and, by contracting the cell-walls, ejected the pollen to the smooth petals, from which it easily fell to the immature anthers and stigmas, when the flower closed for the night.

Knowing that another species of butter-cup, the *Ranunculus abortivus*, had fixed spreading petals which did not close at night, and which, though with comparatively large nectariferous glands full of a liquid secretion, was wholly neglected by insects, and yet had every flower seeding profusely, he was anxious to find, in view of his other discoveries, how these were fertilized. Visiting a wood after twilight, to ascertain if any nocturnal insects visited them, he found that though the petals did not close at sundown, the slender pedicles drooped, inverting the flower, and in this way the pollen found its way from the petals to the stigmas without any difficulty whatever.

Plants, of course, had peculiar functions to perform, and there were pre-ordained plans and special arrangements through which these functions are exercised. But the workings of plant life are so complicated, that, though we see certain results follow certain movements, we are not always sure that we perceive the great and deeper object aimed at in the order of nature. Hence arose the differences of opinion prevailing in regard to the object of cross fertilization. Some plants had arrangements which seemed to preclude the possibility of self-fertilization, and the assumption followed that nature abhorred close breeding in plants, and specially designed such structures to secure the plant against it. He believed that nature had a deeper purpose, as yet unknown; and chiefly because of just such instances as he had given this evening, where nature could not abhor close breeding, when the result of the "sleep of plants" was most perfect in securing self-fertilization.