

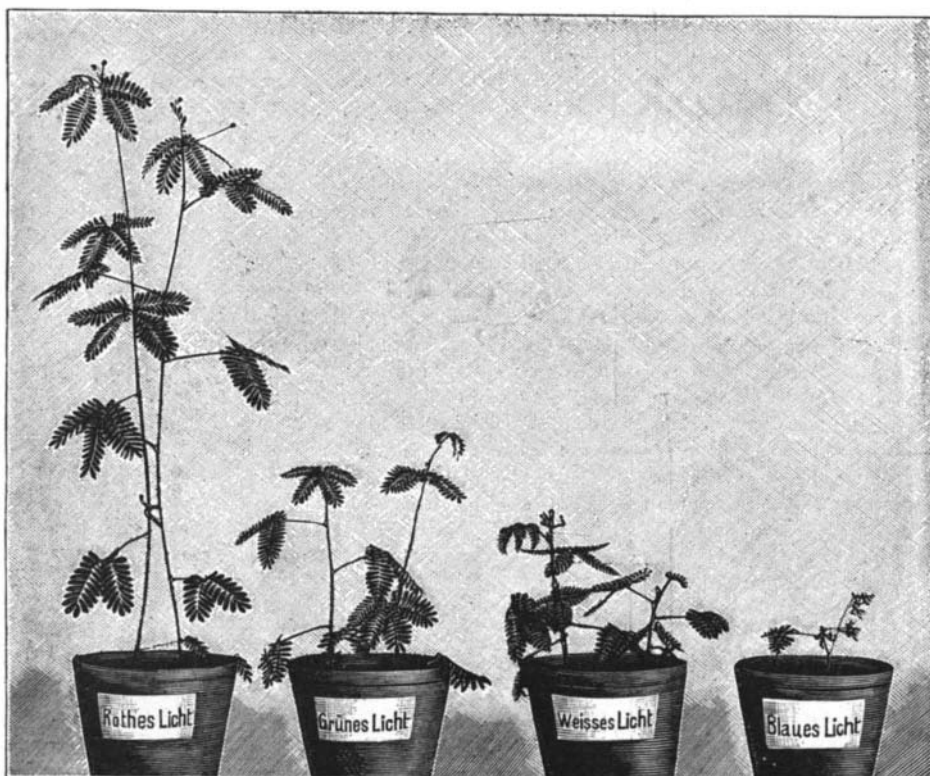
**THE PHILOSOPHY OF PLANTS.**

It is well known that most animal organisms need the direct influence of sunlight for their proper development, and in the same way plants and, in fact, all life on earth, depend on the action of this wonderful agent. The beautiful structure of plant cells, the study of which constitutes the most interesting part of plant biology, has never been properly understood until now; but men like Liebig and others have determined the peculiar use of the cells in the life of plants and have also included in their investigations, as of equal importance, the processes of nutrition. Present knowledge shows that plants take from the atmosphere what is needed for the formation of the cells, and also throw off useless material through the leaves. Thus carbon is taken up by the leaves, which transform, under the influence of sunlight, the carbonic acid taken from the air and through the roots into carbon and oxygen. Water and salts are also taken up by the roots of the plants.

The various ways in which the sunlight affects the leaves and blossoms, and consequently the whole development of a plant, must be considered in the study of plant physiology.

It is well known that sunlight has a decided influence on the coloring of the leaves, which look sickly and pale when the plant has only a little sunlight, whereas strong sunlight increases the amount of chlorophyl, thereby giving the leaves a richer color. Referring to the influence of sunlight, we may with propriety speak of the rays that work chemically, others which act simply as dispensers of heat, while still others are simply light rays, even though there is not actually such a division in nature. The chemical action of the sun's rays can be best understood by the wonders of photography, and we certainly cannot go astray in assuming that certain rays of the sun's spectrum also have a special influence on the plant cells, which will, doubtless, affect the plants of the different species differently, for the conditions of light and heat impress themselves clearly on the character of the plants.

Former observations have already proved that certain rays of the sun's spectrum have a harmful effect on plant organisms, while, on the other hand, others accelerate the circulation of the sap and the assimilation of nourishment, thus promoting the growth of the plant. A recent experiment made by the well known French physicist, Camillo Flammarion, at the Agricultural and Climatological Experiment Station, at Juvisy, indicates plainly the effect of different colored light upon plants, and the result is of special value, practically and theoretically, to plant physiologists and climatologists. It has been clearly shown by the various experiments that ordinary "colorless" light is represented by natural sunlight, because, when exposed only to it, health and natural growth reign. Colored light, according to the particular color used, causes either one sided acceleration or retardation of the development of the plant. In his most interesting experi-



**EFFECT OF DIFFERENT COLORED LIGHT RAYS UPON PLANT LIFE.**

ment, Flammarion adopted the plan of exposing sensitive plants (*Mimosa sensitiva*), which he raised from seed, to different colored light. These plants are specially sensitive to the effect of light and to touch, and were, therefore, well adapted for Flammarion's experiment.

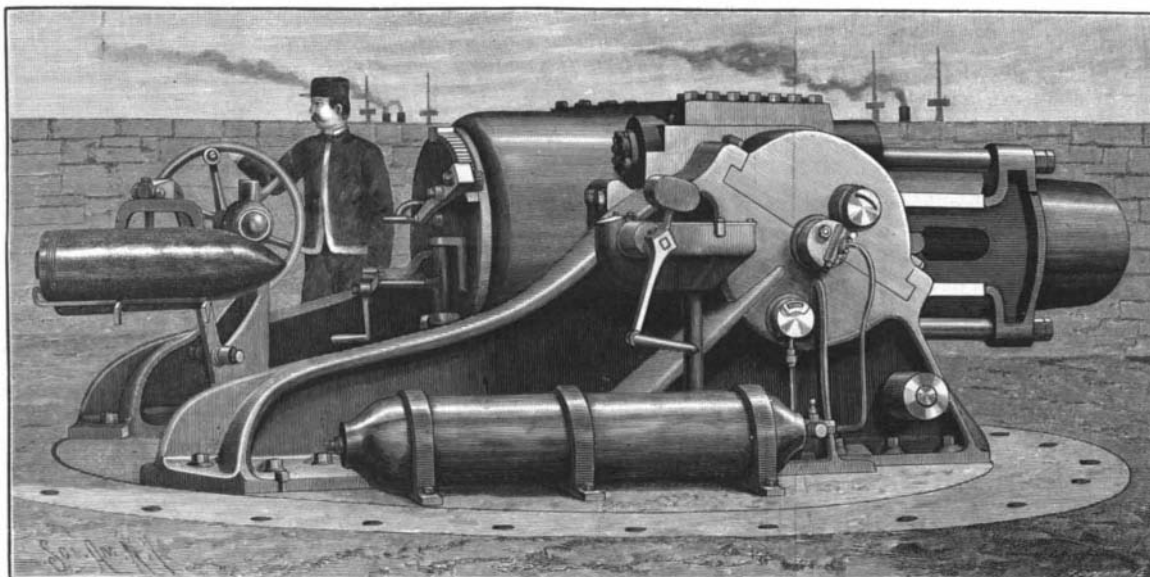
He planted a number of seeds, and the seedlings, after they reached a height of about one inch, were

the blue light was most marked. The leaves of the latter were, indeed, dark green, while the leaves of those subjected to the red light were pale, poor in chlorophyl, but the plants themselves seemed unhealthy and stunted; they had gained nothing in height since they were placed under the blue glass. Therefore, it was proved that the blue light was not only an impediment, but an actual injury

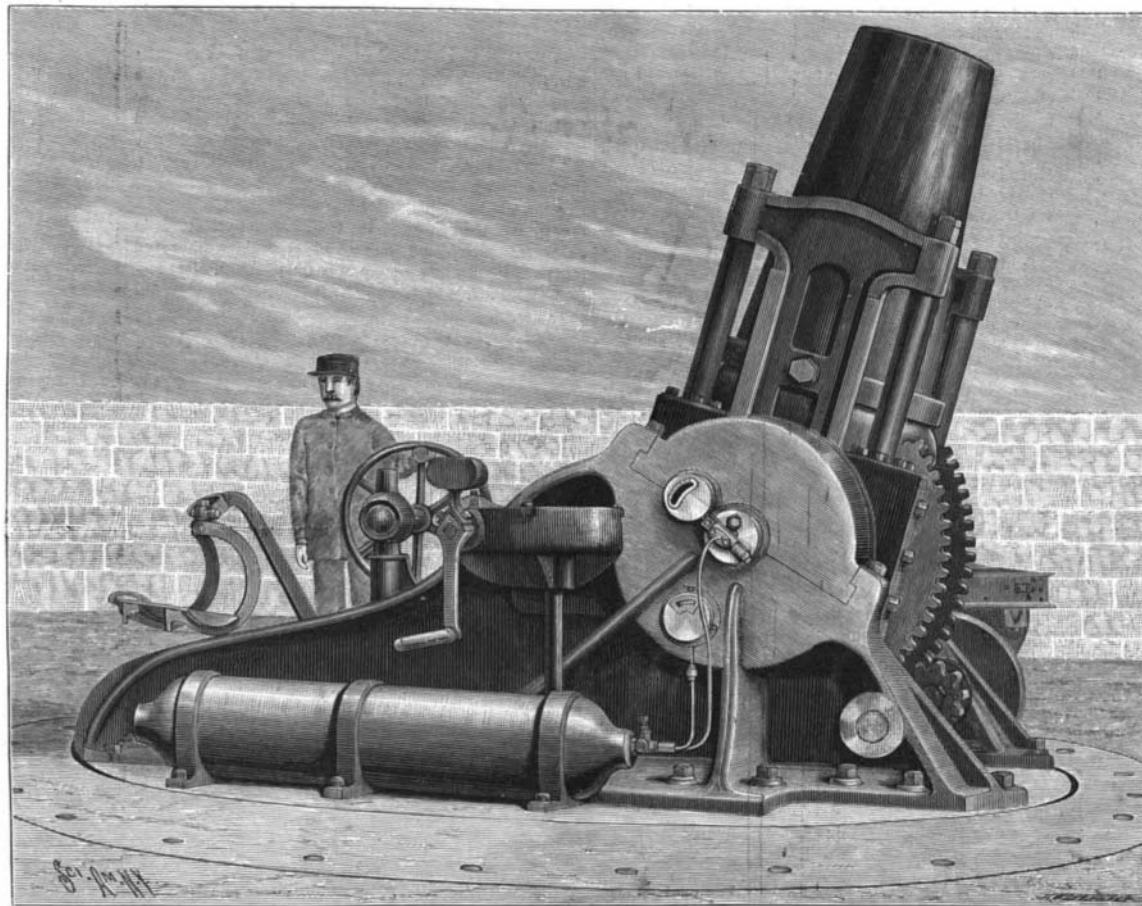
to vegetation. The effect of the red light was noticeable, not only in the growth of the plants, but also in their sensitiveness, for even the slightest touch, a breath, was sufficient to cause the leaves to close and the little stems to droop. The plants exposed only to white light were not so easily affected, and those raised under blue glass were not at all sensitive. Those raised under white light must be considered normal. They were more stocky and showed a greater tendency to bud, but the buds did not open.

Flammarion extended his experiments to other kinds of plants, such as geraniums, strawberries, etc., but in all cases blue light proved injurious to vegetation, and plants that were exposed to its influence for months showed no development. All the functions of the plant organism seemed to be suspended. The fruit of strawberry plants developed under bells of different colors, but varied considerably in size and quality, as in some cases the leaves were developed at the expense of the fruit, and in other cases, as when the plants were exposed to blue light, growth was impeded in every way.

By making these investigations Flammarion has given an impulse to the study of the subject, and new results will be obtained which will be of practical use in gardening and the propagation of plants.—*Der Stein der Weisen.*



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