Light and Growth.

THE action of light on plants has had a perennial interest for plant physiologists, and recently the subject has received some concentrated attention. Ferdinand Hercik (*Publications de la Faculté des Sciences de l'Université Masaryk*, No. 74, 1926) has tried to correlate the action of light and the surface tension of the expressed sap of his plants. He finds that the sap of normally grown seedlings of Lupinus, Sinapis, and Pisum has a greater surface tension than sap from stems of etiolated seedlings. On the other hand, sap from leaves of normally grown seedlings has a smaller surface tension than sap from leaves of etiolated seedlings. Now etiolated plants have usually greater stem growth and less leaf growth than normal plants, and the author correlates the greater surface tension with less growth and the smaller surface tension with greater growth. If, however, seedlings have the same length, then the surface tension of their respective saps is the same irrespective of the conditions under which they have been grown. The author has not traced the causal chain between the surface tension of the sap and the actual phenomena of growth.

In a series of papers in the *New Phytologist* (vol. 24, 5, and vol. 25, 3 and 4), Prof. J. H. Priestley deals with the problem from a slightly different viewpoint and advances some tentative explanations of his results. In the case of the broad bean (*Vicia Faba*) he was able to destroy some of the more marked etiolation phenomena by only very brief exposures to light—two minutes in every twenty-four hours. He points out that any change produced on etiolated plants by the action of light must be initiated, not by the effects of photosynthetic products, but by the photocatalytic effect of light upon the products of metabolism. For example, cells from the cortical region of an etiolated broad bean tip are incapable of being plasmolysed in a 17 per cent. cane-sugar solution, but, after exposure to artificial light for one hour on two successive days, are plasmolysed readily. The author considers that the photochemical action of light releases protein and fatty substances from the developing walls of the cells intervening between the central cylinder and meristem; and these walls, now consisting of purer cellulose, readily permit of the transfer of the nutrient sap from the central cylinder, with an ensuing more diffuse and more superficial development of merismatic tissue. In this way growth, which in the etiolated plant is confined to tips of stems, becomes redistributed.

The phototropic curvature of grass and cereal coleoptiles, the subject of much experimentation, is explained by Prof. Priestley on the basis of the foregoing hypothesis. Thus the side of the coleoptile exposed to the light becomes in consequence more permeable, with greater guttation through the apical hydathode from the vein nearer the light. The cells of the lighted side will therefore extend in length less than those of the darkened side, producing a curvature towards the light.

Following still another line of attack, Prof. Y. Yoshii has experimented on the influence of the relative length of day and night on plants (*Science Reports of the Tôhoku Imperial University*, 4th series, vol. 2, 2). His results, in the main, confirm and extend the work of Garner and Allard in grouping plants into two categories, long and short day plants, according to the length of daily illumination necessary for the production of flowers (*Jour. Agri. Res.*, **18**, p. 553, and **23**, p. 871). The evidence adduced leads to the conclusion that there is probably another group of plants which are nearly or entirely indifferent to photoperiods, but affected by other factors as to time of flowering. The author finds that the optimum photoperiod for reproduction does not result in maximum vegetative growth, and that closely related plants, sometimes even varieties of the same plant, may behave quite differently as regards photoperiods; for example, the late variety of rice plant is a short day plant, while the early variety is indifferent to regulation of light period. This seems to suggest that some other factors besides those concerned in photosynthesis are involved. If the photoperiod is the key to the distinction between spring and winter varieties of wheat, then researches along this particular line may have some application in the practical field of crop production.

Yorkshire Ammonites.[1]

THE amateur geologist who collects Yorkshire ammonites may approach the collection of papers before us with expectation, but he is likely to be disappointed if he hopes to identify his specimens from the descriptions there given. The work is not for the amateur, but for the specialist; and even he will have to dig deep in involved sentences to find the information which only so patient and expert a worker as Dr. Spath can give. These little papers have really an immense scope, gathering up and pronouncing upon outstanding uncertainties in the systematics of the main groups to which belong all ammonites commonly found in the Lower Lias; supplying new generic names where needed; and tilting at the evolutionary conceptions of previous ammonite workers.

To promote the first aim, Dr. Spath appeals to Yorkshire geologists to go into the field and collect Yorkshire ammonites bed by bed. In proposing new generic names, he considers that the quotation of a genotype is sufficient diagnosis. That would be more justifiable if the genotype were a species known by an existing holotype, and not mainly or merely by a figure. It is also probable that ammonite specialists the world over will miss the new genera thus casually proposed in notes on a local fauna in a journal which caters for amateur naturalists rather than professional palæontologists.

The fact is that Dr. Spath has tried to pack into these modest papers matter far beyond their scope, and he has condensed it almost to the limits of intelligibility. We feel that he could expand his remarks on evolution into an enthralling thesis, but here we can catch only the barest outline of his scheme. He has nothing but scorn for those who find comfort in supposed ammonite lineages, but he does not give them instead a clear-cut theory of evolution. The following points, however, seem to stand out: (1) The two great families, namely, Phylloceratidæ and Liparoceratidæ, persisted almost unchanged throughout the Mesozoic, and were the radical stocks whence group after group repeatedly sprang, rapidly evolved in many directions, and quickly died out. (2) Already in Triassic time all possible forms of ornament and whorl-shape had been tried, only to reappear again and again in later stocks (we must not say lineages). This seems to support

[1] Hull Museum Publications, No. 143. "Notes on Yorkshire Ammonites." By Dr. L. F. Spath. Reprinted from the *Naturalist* for April-July, Sept.-Dec., 1925; Feb., May, June, Sept., Nov., 1926.