

### Degrees of Frost

DR. J. SATTERLY, of the Physics Department, University of Toronto, writes to ask whether it is a fact that in England  $x$  degrees of frost means a temperature  $x$  degrees below  $30^{\circ}$  F., not  $x$  degrees below  $32^{\circ}$  F., the reason being that English meteorologists consider that the "freezing of plants" or the killing of tender plants by frost does not begin at  $32^{\circ}$  F. but two degrees lower. The answer to this question is, of course, that both for the public and professional meteorologist  $x$  degrees of frost ordinarily means a temperature  $x$  degrees below  $32^{\circ}$  F., but the method of reckoning *ground frosts* adopted by the Meteorological Office is to account as an occasion of ground frost every night on which a thermometer freely exposed to the sky, with its bulb resting on the top of short grass, indicates a temperature of  $30^{\circ}$  F. or lower. Such a thermometer is peculiarly well placed for recording low temperatures; the underlying turf protects it from heat conducted from the soil; it experiences very little wind, the action of wind being to prevent it from cooling much below the temperature of the surrounding air. The result is that a lower temperature is generally indicated than is reached by plants. This alone would make it improbable that vegetation would suffer frost damage every time the exposed thermometer fell slightly below  $32^{\circ}$  F., but in addition there is the fact that the freezing point of sap would normally be below  $32^{\circ}$  F. This official practice is a very old one, and it is difficult to know whether both these considerations were borne in mind by those responsible for it. It is a matter of common observation that there are many occasions when readings substantially lower even than  $30^{\circ}$  F. are obtained without vegetation suffering; much depends, no doubt, upon the length of time during which the temperature has been below  $30^{\circ}$  F., and whether any plants exceptionally liable to frost damage are present and also bearing sensitive new growth such as might appear during a sudden spell of unseasonable warmth and moisture.

### Origin of Fluted Doric Columns

MISS A. D. BETTS, Thorn Cottage, Byways, Berkhamsted, Herts, writes to suggest that the fluted columns of Greek architecture were copied from plant stems, such as those of an umbelliferous plant. From inquiries we have made upon this subject, it appears that there is a lack of decisive evidence as to these columns having been modelled from plant life, though the subject has been considered on a number of occasions and by various writers. In discussing these columns Whibley ("A Companion to Greek Studies") states, "The origin both of this practice and of the essential form of the column is very obscure". According to the same writer, the earliest of the Doric columns were merely substitutes for wooden tree trunks that had served the same purpose. It is probable that the fluted column may have arisen quite independently of any model or pattern afforded by plant life. No example occurs to us of a woody species indigenous to Greece with a constantly fluted stem or bole. Fluted stems are found not uncommonly

among herbaceous plants. This is particularly noticeable in the family Umbelliferae, where the fluting exhibits greater regularity perhaps than in other families. Regular fluting is also conspicuous on the leaf-sheaths of some of the coarser-growing grasses, particularly when dried, also in certain of the sedges. A large number of umbelliferous plants occur in Greece as in other Mediterranean countries. Many of these have economic uses, and were known and commonly employed by the ancient Greeks on account of their esculent or medicinal properties; for example, fennel (*Foeniculum vulgare*), dill (*Peucedanum graveolens*), cumin (*Cuminum cyminum*), coriander (*Coriandrum sativum*), caraway (*Carum Carvi*). Another species apparently well known to them and occurring in Greece at the present day is the so-called giant fennel (*Ferula communis*), of which it is stated, "the tough stems were used by school-masters as ferules" (Whibley). From an examination of the dried material of this plant the stems do not appear to be conspicuously fluted.

### Victorian Physicists

IN his presidential address on January 24 to the Physical Society on "Some Reminiscences of Scientific Workers of the Past Generation, and their Surroundings", Lord Rayleigh urged that the history of science is quite as much involved with the personalities of the men who have made it as is any other kind of history. He suggested that some knowledge of the personalities of the scientific workers of past generations, the conditions of their lives and the points of view from which they worked can often provide a useful corrective to the limitations, narrowness and sacrifice of historical perspective that all too frequently result from the familiar, but necessary, process of digesting original memoirs into text-books. He described many details and incidents, specially valuable and interesting because they derived from personal friendship and acquaintance with the subjects themselves, of Kelvin in his later years, of Dewar and his work at the Royal Institution, of Dewar's remarkable and gifted assistant, Lennox, and his very important share in the liquefaction of hydrogen, of Crookes and his many interests, and of Schuster, an unfortunate victim of the hysterical spy-mania prevalent in England in the early years of the Great War. Lord Rayleigh further urged all those with the good fortune to be in personal contact with the great workers of the generation above them to record such knowledge of this kind as might possibly be valued by posterity, a duty, he considers, which has been too little regarded in the past.

### The Soaring Cycle

A NEW journal, the *Soaring Cycle*, has recently been issued by the Soaring Flight Co., Departmental Bank Building, Washington, D.C. (10 pp., 25 cents). The object of this new serial is the promotion of insight into soaring flight by studying that of birds, and the first number consists of about forty extracts from various writers. The general idea is admirable; but it works out rather unfortunately owing to the nature of the material employed. There are three