of extant elasmobranchs (Holocephali and Euselachii). These dual lines of evidence point to the primitive and non-specialized character of this autonomic nervous system, which reflects a stage in the evolution of the autonomic systems of Teleostomes and Tetrapods.

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Photoperiodic Induction and the Development of Growing Apex in Rice

The inflorescence of rice is a panicle; its development is different from that of the spike of cereals studied by Purvis[1] and Bonnet[2,3]. It has been noted by Purvis[1], Purvis and Gregory[4], Bonnet[2,3] and Sharman[5] that the development of a spike is preceded by the formation of double ridges on the main rachis; one of the ridges forming into a spikelet and the other a subtending bract under an effective photoperiod and with low temperature of germination. In the absence of these conditions the primordia grow into leaves. The whole theory of the hormonal mechanism of flowering by Purvis and Gregory is based on this fundamental fact. The behaviour of rice is different from that of rye in several important aspects. The effect of short days on rice is quantitative in its flowering response[6]. While in winter rye Purvis and Gregory have observed that short days up to six weeks accelerate flowering and that subsequent long days are essential. Exposure to short days for periods longer than six weeks retards flowering. Tillers in rye show the same behaviour as the main shoot, indicating that the whole plant is affected by the treatment, although at the end of the treatment the majority of the vegetative buds are not yet formed. In rice (var. Rupsail) the tillers behave differently from the main shoot in respect of their leaf number and ear emergence by short-day exposure. The growing apex in its transition from vegetative growth to reproduction elongates considerably at the top, and along the edges several small groups of cells protrude which ultimately develop into branch rachides bearing more than one spikelet. Nowhere in the present investigation have double ridges, as noted in wheat, barley and rye, been seen. With an adequate dose of photoperiodic treatment the vegetative apex gradually passes into a main rachis bearing branches on which spikelets are formed. Once the rachis is formed under short-day conditions it continues to form spikelets irrespective of subsequent long days. The photoperiodic stimulus acts quantitatively on the growing apex. A minimum of four weeks exposure is necessary for 100 per cent flowering of the main shoot; after three weeks 66 per cent, and two weeks 3 per cent flower. In the case of first and second tillers six weeks are essential. Anatomical changes in the growing apices reveal that after four weeks all the vegetative apices are transformed into inflorescences; after three weeks some apices are reproductive and others remain vegetative all through.

In a previous paper[7] a lag in the flowering of the tillers has been noted, and this was suggested to be due to the absence of the stimulus in the growing apices of the tillers. Observation of histological changes in the growing region has now substantiated this assumption. It has been noted that only two tiller buds are formed during the periods of six weeks short-day exposure. The tillers formed from these buds flower later than the main shoot but much earlier than the other tillers of the same plant.

Considering the results so far obtained with rice in this laboratory, it is apparent that prior to the initiation of flower primordia, development of the primordia to spikelets and differentiation and normal development of the floral organs, photoperiodic induction involves a series of chemical reactions, presumably by the participation of a hormone or hormones. That the treatment provokes considerable changes in the metabolites is evident from the results noted previously[8,9]. With the data obtained, it is not possible to formulate the different reactions involved in the flowering of rice similar to those formulated for winter rye by Purvis and Gregory and for *Xanthium* and Biloxi soybean by Hamner[10]; further work is necessary. It is admittedly a fact that generalization with respect to the possible action of flowering-hormone is difficult because of variations in response in different plants under varying environmental conditions.

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Flow of Momentum and Mass across the High-Pressure Belt of the Earth's Atmosphere

The atmospheric angular momentum generated at the earth's surface between latitudes $\pm \varphi$ must, over a long period, be balanced by an equivalent outflow of angular momentum across these parallels. It was argued by Jeffreys[1] that the main agents of this efflux are rotations of cyclonic dimensions lying side