Comments and Communications

Pressure Patterns in Bird Migration

Before I read H. Landsberg's suggestion (*Science*, December 24, p. 708) that, on migration, birds fly according to meteorological pressure patterns, I had come to a similar conclusion after an experience with the redwing (*Turdus musicus* L.). Redwings usually come from Norway to the east coast of the United Kingdom in autumn or early winter and gradually pass further south as the weather becomes colder. With the advent of warmer weather in spring, they retreat in the opposite direction. But this rule does not always hold, as is shown by a remarkable immigration which took place in February 1948 at Hill Head, Hants. The month opened with spring-like weather, alternating sunshine and showers, the wind being in the southwest. By February 7 the hazel catkins were out and the sallow buds were opening. On February 16 there was a sudden change—the weather was cold and dry with an east wind which blew for three days before shifting to the northeast. There was then a sprinkling of snow at night followed by slight snow. By next day it was freezing and more snow fell. On February 21 with the wind still northeast, there was a blizzard of snow which lasted most of the day. All through that day there was a continuous stream of small parties of redwings flying low and crossing the coast from the south. Next day, the snow lay four inches deep, a most unusual occurrence at Hill Head, and a few more redwings came in from the sea. The snow had stopped falling by that morning, and all day there were crowded parties of redwings, with a few fieldfares (*T. pilaris* L.), sheltering under the bushes in our garden.

Reference to the meteorological maps of that period shows that there was an anticyclone centered in the North Sea, with the result that snow must have fallen heavily in Scandinavia, obliterating the redwings' food supply, whereupon the birds must have taken to the air to seek fresh provender and have been carried by the wind of the anticyclonic pressure systems to Denmark, the Lowlands, and France, and thence to the south coast of England. Far from finding a new food supply, the birds had been carried helplessly along the outer edge of the pressure system, and thus remained in the area of snow precipitation, with the result that many of them died of starvation.

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On the Carcinogenesis of 2-Substituted Fluorenes

The noncarcinogenic coal-tar hydrocarbon, fluorene, is made carcinogenic by the introduction of such groups as acetylamino, diacetylamino, amino, and nitro in the 2 position (H. P. Morris, C. S. Dubnik, T. B. Dunn, and J. M. Johnson. *Cancer Res.* 1947, 7, 730–1). In a paper dealing with a biochemical hypothesis of the genesis of cancer (L. A. Pinck, *Ann. N. Y. Acad. Sci.*, 1948, 50, Art. 1, 1–17) it was postulated that the position of the substituent rather than its chemical composition was in a larger measure responsible for the functional attribute of the carcinogen. It was indicated that other substituents in the 2 position of the fluorene molecule, having electronegativities within certain limits in the range of that of the acetylamino group, might also make those fluorene derivatives carcinogenic. From a chemical viewpoint the methylene group in the 9 position of the fluorene molecule (encircled in Fig. 1) is greatly activated by the presence of a substituent in the 2 position. This point was confirmed by work recently published.

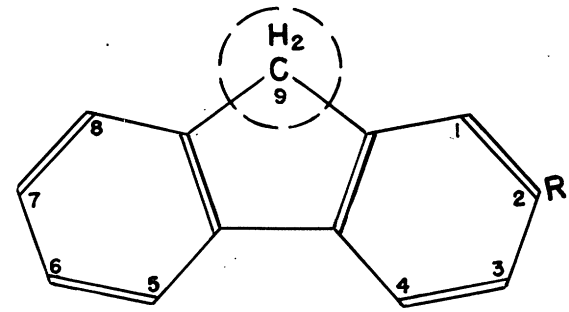

FIG. 1. A 2-substituted fluorene.

Schiessler and Eldred (*J. Amer. Chem. Soc.*, 1948, 70, 3958–9) found that 2-acetyl-fluorene is readily oxidized to fluorenone-2-carboxylic acid by the action of potassium hypochlorite at room temperature, whereas fluorene under the same conditions does not yield a trace of fluorenone. Ray, Weisburger and Weisburger (*J. org. Chem.*, 1948, 13, 655–662 reported that 9,9′-bifluoryl-2,2′-dicarboxamidine dihydrochloride is easily converted to the 9,9′-bifluorylidene derivative by air oxidation and that special precautions are necessary to prevent its oxidation in the course of crystallization. The chemical behavior of the above compound is quite different from that of 9,9′-bifluoryl. A change in the activity of the methylene group due to the presence of a nitro group in the 2 position of fluorene was also reported by other investigators (E. Bergmann, H. Hoffman, and D. Winter. *Ber.* 1933, 66, 46–54; A. Novelli and A. P. G. de Varela. *Ciencia E Investigacion* 1948, 82–84).

On the basis of the reactions cited above and those referred to in the cancer paper I should like to call the attention of oncologists to the very reactive nucleus of a carcinogenic fluorene, namely, the methylene group in the 9 position, and to the first step in carcinogenesis which obviously involves the oxidation of this particular group as postulated in my hypothesis.

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