animals. Sessile hydrozoans, polyzoans and sea anemones are attached to the surface while serpulids and sabellids live in tubes of their own buried within the tissues of the sponge with only their outer ends exposed. Asteroids, brittle stars, copepods, isopods and amphipods are seen to live in the canal systems of the sponges. Such animal associations are unusual in the case of the Royapuram sponges. Occasionally, however, a few colonies of hydrozoans or polyzoans are found growing on the surface of the sponges.

The harbour sponges are very fragile and soft, and easily torn, whereas the Royapuram sponges are firm in texture and are never soft. The harbour sponges are not as large as the Royapuram ones which are usually more than 8–10 cm. in length, 5–9 cm. in breadth and 3–5 cm. in thickness. No sponge collected in the harbour measured more than 5–6 cm. in length, 3–4 cm. in breadth and 1 cm. in thickness.

The harbour sponges vary in their mode of attachment to the substratum. Those that occur on the side walls and on boat-sides have a small base that serves as attachment to the substratum, and the sponge is flabby and branching. The sponges that occur on living and dead bivalve shells which in turn are attached to the side walls are found encrusting the shell surfaces. The Royapuram sponges are usually flatter and broader, with their entire base attached to the rocky substratum, and are also found to contain varying quantities of sand particles in their bodies.

The above-mentioned differences between the sponges occurring in these two habitats are clearly seen in *Oceanapia arenosa* and *Lissodendoryx similis*, which occur in both localities. The individuals collected from the harbour are different from those belonging to the same species but occurring on the Royapuram beach. The differences relate to the features enumerated above.

The development of the stereogastrula larvæ of *Lissodendoryx similis* that occurs in both localities was studied[2] and was found to be similar.

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Selective Visits of Butterflies to Flowers: a Possible Factor in Sympatric Speciation

Two varieties of *Lantana camara* L. are feral and common in the suburbs of Calcutta. In that called 'pink' the buds and old flowers are pink, whereas the young flowers are white ; in 'orange' the buds and old flowers are orange and the young flowers yellow. I have previously reported[1] that these varieties are visited by different species of Papilionoidea. A small experimental garden containing three plants of each colour has been watched for 46·75 hr. extending over a period of 13 months. Visits of all butterfly species were recorded. Table 1 gives the most recent totals on the five most frequent visitors. The long duration of the periods over which the observations were made makes it certain that more than one individual of each species was observed, and this has been confirmed by marking individuals. As these cannot be presumed to have been exposed to exactly similar stimuli we must assume that these preferences are not learnt and temporary, like those previously reported for bees[2], but are characteristic of all, or most, individuals of a species.

Table 1

Species	Family	Days	Months	Times observed to feed on	
				Orange	Pink
Precis almana	Nymphalidae	16	4 (12)	218	13
Danais chrysippus	Danaidae	18	3 (3)	142	152
Papilio polytes	Papilionidae	4	2 (2)	15	31
Papilio demoleus	Papilionidae	13	3 (3)	42	98
Catopsilia pyranthe	Pieridae	27	5 (13)	40	603
Baoris mathias	Hesperiidae	12	3 (3)	1	108

The numbers in the column 'Months' give the number of months during which that species was observed, and, in parenthesis, the total number of months which include the first and last observations of it.

The evidence that the butterflies are reacting visually to the colour of the flower, and not to some other stimuli correlated with it in these stocks, will be discussed elsewhere. But whatever the nature of these stimuli such instinctive preferences must very greatly favour homogamy. So if a new colour mutant is a recessive the insects' behaviour will maintain homozygosity once mutant phenotypes have segregated in the population : if a dominant, the insects will both produce homozygotes and maintain them in the population. The two colour forms will be more or less isolated sexually, and thus have the possibility to become further differentiated, for example, in odour, structure, and flowering time, to suit different pollinators. Therefore, the discovery of such capacities among insects re-opens the discussion as to whether sympatric speciation can be initiated by a single gene mutation[3].

More details will be published elsewhere, including observations on individuals of other species, and on imagines which have emerged in captivity.

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Nodulation Patterns on Legumes

Fred, Baldwin and McCoy[1] made the generalization that effective strains of *Rhizobium* produce few but large nodules, usually located on the upper root system of the host, whereas ineffective strains form numerous small nodules widely distributed over the root system. Subsequent detailed studies on the physiology of nodulation have been summarized by Nutman[2], with a hypothesis relating nodule density on the root to the number of preformed foci, themselves determined by genetic factors affecting root morphogenesis. Dart and Pate[3] recently reported studies concerning the effects of delayed inoculation on nodule production and position.

Our observations with lupins, reported here, establish the importance of species in nodulation patterns, and suggest that it may be unwise to generalize from limited legume representation to 'legumes'.

Lupinus angustifolius L., *L. digitatus* Forsk., *L. luteus* L. and *L. mutabilis* Sweet were nodulated