November–December than at the same night temperatures in August or March; (6) a size effect, large species in captivity being in general less susceptible than small; (7) a climatic effect, lower temperatures being required to induce torpidity in species from high altitudes, but the resultant torpidity then being more extreme, with longer recovery period; (8) a specific effect, susceptibility varying in species of similar size and habitat; (9) an individual effect, individuals of the same species showing different susceptibility (this may in part be due to temporary differences in condition).

Torpidity appears to be a temporary poikilothermy, rather similar to that already described for bats[1]. In birds, one of us (C. S. W.) has noted a similar but less specialized condition in colies (*Colius*). Torpidity of a rather different nature has also been noted in swallows[2], but here recovery is only possible before complete torpidity is reached.

Torpidity in the fully specialized condition seen in humming-birds appears to be an adaptation promoting the survival of these very small birds in conditions which temporarily make the maintenance of normal body-temperature difficult or impossible. The fact, however, that it occurs also in a related family (colies), and scarcely, if at all, elsewhere among birds, indicates a general preadaptive proneness to the condition.

Temperature measurements of birds in different stages of torpidity will be undertaken with a thermocouple next winter, and will be incorporated with a fuller account of avian torpidity in general.

J. S. HUXLEY.
C. S. WEBB.
A. T. BEST.

Zoological Society of London,
Regent's Park,
N.W.8.
March 24.

[1] Burbank, R. C., and Young, J. Z., *J. Physiol.*, **82**, 459 (1934).
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Segregation in Asexual (Apomictic) Offspring in *Rubus*

THE diploid species of *Rubus* we have examined always reproduce sexually. In the polyploid forms and species, however, reproduction may be (1) entirely sexual, (2) entirely non-sexual, apomictic, or (3) partly sexual and partly non-sexual.

The polyploids vary widely in the degree to which apomixis is developed, and a particular species used as female parent will show a variation in behaviour according to the species used as male in the pollination. The occurrence of segregation is not conclusive evidence of sexual reproduction, for we find that segregation occurs within the non-sexual offspring and has given rise to new and distinctive types, which in some cases breed true. For example, *R. nitidioides*, $2n = 28$, a species with comparatively small flowers and normal five-leaflet leaves, when crossed with *R. thyrsiger*, $2n = 28$, gave plants of three kinds, (1) a very small proportion of sexual hybrids, (2) a large proportion identical with the maternal parent *R. nitidioides*, and (3) a new true-breeding form with large flowers and seven-leaflet leaves, which shows no trace of the male parent. The dicœcious species *R. vitifolius*, $2n = 56$, with three-lobed leaves, when crossed with the diploid *R. idaeus*, $2n = 14$, gives offspring all of sexual origin, and all are pentaploid, $2n = 35$. *R. vitifolius* crossed with the tetraploid form of *R. idaeus*, $2n = 28$, however, gave a family consisting of plants of two kinds, with 42 and 56 chromosomes. The 42 chromosome plants are of sexual origin and have many of the characters of the male parent, such as hermaphrodite flowers and five-leaflet leaves. The 56 chromosome plants, on the other hand, show no trace of *R. idaeus*, and are evidently of apomictic origin. They all have three-lobed leaves and are identical with *R. vitifolius*; but approximately one half of the plants have female flowers and the other half male flowers. The progeny as a whole is dicœcious like the female parental species. We therefore have segregation of characters even with an apomictic mode of reproduction. Evidently the apomictic embryo arises at a stage subsequent to the first division of meiosis, presumably by diploid parthenogenesis. This means that there are intermediate methods of reproduction which although superficially vegetative have certain of the properties of sexual reproduction, giving rise to genetical variation through crossing-over.

Incidentally, the results we have obtained with the American species *R. vitifolius* show that the conclusion of Gustafsson[1] that "all American species belonging to the *Rubus* subgenus Eubatus are sexual" is not of universal application.

The results are also significant in view of the difficult taxonomy of *Rubus*. They show not only how new forms and species can arise, but also how they are able to maintain themselves in Nature. Many of the species and micro-species of *Rubus* are evidently clones and sub-clones, produced by segregation and maintained by apomixis.

M. B. CRANE.
P. T. THOMAS.

John Innes Horticultural Institution,
Merton,
London, S.W.19.
March 28.

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A Difference in Response of Normal and Tumour Tissue

PREVIOUS papers have reported the effect of respiratory stimulating factors (*RSF*) prepared from yeast on the respiration of liver, skin and yeast[1,2,3,4]. The object of the research here reported was to investigate the effect of a crude sample of *RSF* on transplantable tumour tissue.

In the present experiments, crude *RSF* was prepared from Fleischmann's bakers' yeast (*Saccharomyces cerevisiæ*) by a method reported by Cook, Kreke and Nutini[4]. The preparation used in these experiments corresponds to sample *A* in the above work. The crude *RSF* was prepared by extracting yeast successively with 95 per cent and 50 per cent alcohol, combining the extracts and concentrating *in vacuo*. The concentrated extract was redissolved in distilled water and autoclaved at 15 lb. pressure for 15 minutes. The *p*H was adjusted to 7·3.

Preliminary experiments showed that this crude extract in a concentration of 13·9 mgm./c.c. stimulated the respiration of mouse liver 160 per cent and of mouse skin 50 per cent.

Employing Warburg direct manometric technique, the effect of the *RSF* was tested on the respiration of transplants of a spindle-cell carcinoma of the mammary gland. The transplantable tumour (15091*a*) was obtained from the Roscoe B. Jackson